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OF USEFUL AND ENTERTAINING

KNOWLEDGE.

"GET WISDOM: AND WITH ALL THY GETTING, GET UNDERSTANDING."

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CUBA.

The contiguity of the Island of Cuba to the United States, its fertility, tropical productions, and extensive trade, make it more valuable to the people of this country, in a commercial point of view, than any place of equal size, (England excepted,) perhaps in the world:—important, however, as it is, our information in regard to its commerce, productions and resources, has heretofore been extremely limited and unauthentic.

The first, and only authentic statistical account of the Island that has ever been given to the world, has lately been published by order of the Captain General Don Vives; the information was collected by a commission appointed by him for the purpose, in the year 1827, and may be relied on as correct; at least, from the manner in which it was obtained, we may presume it is not exaggerated, but rather below than above the truth.

Our readers are of course aware that the Island belongs to Spain: it is the most important possession she has left of all that immense territory in the western world, that once acknowledged her sway, obeyed her commands, groaned beneath her tyranny, and was desolated by her avarice and rapacity. It is situated between the 19th and 23d degrees of N. Lat. and between the 2d degree of E. and 8th degree of W. Long. of the meridian of Washington; being 605 miles in length, and from 30 to 117 miles in breadth, and contains about 31,500 square miles.

The Climate of Cuba, taking the whole island together, is one of the most salubrious in the world: situated so near the equator, it might be expected that it would be extremely hot and sultry; this, however, is not the case; the delightful and refreshing breezes which sweep from the sea across the country, cools the atmosphere and preserves an equable temperature; although the average of heat is greater in the Island than it is in this latitude, yet the thermometer seldom rises so high as we have lately seen it stand for several days in succession:—the greatest degree of heat ever known in the Island, is said to be 95 degrees, and the lowest point to which the thermometer has been observed to fall is 40 degrees. The average of the hottest months, July and August, is said to be about 82 degrees, and of the coldest months, December and January, about 63 degrees: no snow ever falls, nor does water freeze in the Island. Along the sea coast where the country is low and swampy, it is sickly, particularly in the large towns, as many of our countrymen know to their cost; back, however, in the interior, there is scarcely a more healthy country in the world—the salubrity of the climate and the uniformity of temperature render it peculiarly favorable to those who are afflicted with pulmonary complaints, and many annually resort to it from the United States to seek that relief which our own variable climate denies them, but which there they seldom seek in vain.

Soil and productions.—Along the sea coast the country is low, wet and marshy, the soil is consequently poor: the tops of the mountains, on the contrary, are arid and rocky, but the intermediate country, which rises with a pretty gradual ascent from the sea to the interior, is extremely rich, and abundantly rewards the labors of the planter. The productions of the Island are, sugar, coffee, rice, cacao, cotton, tobacco, maize, casabe, indigo, pulse, beans, &c.—of these sugar, coffee, rice, maize and tobacco are the most important. In addition to the articles we have enumerated, and which are cultivated, the Island abounds with fruit, and magnificent and valuable trees:—of the fruit, we may mention the orange, the pine-apple, the plantain, the fig, the pomegranate, the lemon, the cocoanut, and almost every tropical kind; of the trees which are found in the forests, and which are made an article of commerce, the mahogany, and several kinds of dyewoods, are the most valuable; cedar, live oak, and pine are also indiginous to the country.

For the following table of the agricultural productions of Cuba, in 1827, we are indebted to the American Quarterly Review, as indeed we are for much of our information in regard to the Island.

Agricultural Productions of Cuba, for 1827.

Productions	Quality.	Valuation Rate.	Estimated value.
Sugar, includ. Muscovado,	204,334,550 lbs.	at 5 cts per lb.	$11,238,400 25
Coffee	72.088,200 "	at 6 cts " lb.	4,325,292 00
Wax	1,579,000 "	" 28 " " "	442,120 00
Honey	1,910,100 "		
Cacao	595,150 "	" 12 " " "	71,418 00
Cotton	953,450 "		
Rice	13,022,425 "	" 4½ " " "	586,009 12
Indigo	1,400 "	1 50 " " "	2,100 00
Maize	242,670,900 "	3 00 " " "	
Tobacco	12,379,600 "	11 cts per lb.	1,361,756 00
Casabe or Youcacakes	7,307,000 "		
Pulse and beans	3,467,250 "	5,00 per bbl.	
Rum or brandy	35,103 pipes	20,00 per pipe	702,060 00
Molasses	81,173 hhds	5 cts per gal.	446,450 50

A single glance at the above table shows the great and superior importance of the article of sugar, over all others. The cane is not an indiginous plant in this Island, but was introduced there from St. Domingo, and the Canaries about the middle of last century, since which time, the amount produced, has been rapidly increasing: the cane, however, which thrives best, and is the most productive, is the kind, which was introduced there, from Otaheite. The average production of an acre of ground, is, according to Humboldt, a little more than 1200 pounds of raw sugar. It is estimated that a sugar plantation, wrought by 300 negroes, will produce 9853 cwt., which, according to the present estimated value, would be worth $49,265.

Coffee is extensively cultivated in the Island, and is, next to sugar, its most important production. Like the cane, the coffee plant is not indiginous, but was brought there in the year 1769, though it is only within the last thirty or forty years, that its cultivation has been much attended to. On the breaking out of the revolution in St. Domingo, many of the planters fled to Cuba, and there recommenced the cultivation of coffee, with which they were better acquainted than with sugar, and which, not being cultivated by the Cubans, promised them more favorable returns for their labor. From that time the coffee plant has rapidly extended in the Island, the number of plantations being, in 1817, stated at 2067, of about 40,000 trees each.

The cocoa tree, from the fruit of which that pleasant and highly nutricious beverage, chocolate, is made, has been but recently introduced; it is a native of South America, is of slow growth, but requires little attention, and the expense attending its cultivation is trifling: it is estimated that one negro will tend 1000 trees, which will produce an average of one pound of cocoa each per annum: the trees, which are large and shady, may be set among the coffee trees, which it is thought to protect by its shade.

Commerce.—To no country, not even Spain herself, is the commerce of this productive island more important, or more valuable than the United States; nor is there one, if we except England and France, with whom we carry on so extensive a trade. Its exports consist principally of sugar, coffee, molasses, tobacco, rum, wax, &c.; and its *imports* of grain, flour, corn meal, liquors and wines, smoked and dried meat, lard and tallow, cotton goods, linen, linseed oil, white lead, glass and earthen ware, soap, drugs, paper, &c. &c. The amount of imports in 1827 is stated at $17,352,855, according to the Custom House reports, to which ten per cent at least, should be added for under valuation, smuggling, &c. Of the vessels employed in the commerce of the island, one half, at least, belong to the United States. A correspondent of the N. Y. Gazette states, that "of the 1702 vessels which entered the ports of the island last year, 969 were American; that is to say, more than half of the whole shipping." The editor of the American Quarterly Review states that it was towards the latter end of the last century that the trade in flour was opened to the United States, and that the average importation of that article from that time to the year 1826, was, to the port of Havana alone, 64,000 barrels annually. In 1827, however, owing to the amount received from Spain, which was 37,662 barrels, the importation from the United States began to fall off—the amount this year was 68,395 barrels; in 1828, the importation from Spain was 86,642 barrels, and from the United States only 30,830. Notwithstanding this falling off in the important article of flour, this country still retains much the largest portion of the trade of the island. By reference to the last annual report of the Secretary of the Treasury, we find the Commerce of the United States with Cuba stated as follows:—Value of *imports* from that island into the United States, $4,866,524: value of *exports* from this country to Cuba, $5,578,889; of which $3,719,263 were of domestic, and $1,859,626, were of foreign produce, leaving a balance in favor of

the United States, besides the *profits* of the trade, of $712,365. The correspondent of the N. Y. Gazette, however, to whom I have before referred, states the total amount of the trade of the island during last year at $32,648,261, of which he says $8,926,302, or more than one-fourth was with the United States. This, he says, has reference merely to the direct trade between the two countries, and does not comprise the carrying trade of American bottoms from Cuba to other nations. Upon what he founds this statement we do not know; the writer seems to speak, however, with much confidence, and either has, or assumes to have, a thorough knowledge of the subject.

Population.—The census of Cuba has never been taken but four times since the Spaniards have had possession of it. These were in 1775, 1791, 1817 and 1827. At those periods the number of inhabitants were as follows:

In 1775,	the whole resident population was	170,370
1791,	- - - -	272,140
1817,	- - - -	551,998
1827,	- - - -	704,867

Of the whole number of inhabitants of the island in 1775 and 1827, there were—

	1775	1827
Of whites,	95,419	311,051
Free mulattos,	19,027	57,514
Free blacks,	11,588	48,980
Slaves,	44,336	286,942
Total,	170,370	704,867

From various facts, it appears that the mortality among the slave population is not only very great, but quite disproportionate to the other classes. The number imported into the island from 1811 to 1817, according to baron Humboldt, was 67,700; and yet the excess of the slave population in 1817 over that of 1811, was only 13,300, from which it would appear that 54,400 had died in the course of six years.

In speaking of the population of the Island, Dr. Abbot, a very intelligent gentleman, who spent several months in Cuba, during the years 1827 and '28, and who was an acute observer, says, "'Till the census, which is taking by the captains of partidos, and the alcaldes of jurisdiction throughout the Island, intended to be very exact, but which will, from the nature of the operation in this country, be lia-

ble to considerable imperfection, shall make its appearance, I venture to put down the whole population of the island at 1,000,000 of souls; of which 500,000 are free, and 500,000 are slaves. Of the free, 300,000 are white, 125,470 are mulattoes, and 74,530 are negroes. Of the slave population, about 50,000 are mulattoes. The proportion of slaves in this estimate is considerably greater than the writers before me have acknowledged; but whoever has travelled in the cultivated part of the island, which is an extensive portion of the whole surface, where a few caballerias of land call for a hundred laborers; whoever considers the imposing fact, that in the twelve partidos of the promise of Havana alone, in 1817, there were no less than 625 sugar estates, and 779 coffee estates; and that both have since increased; the latter astonishingly, will have no difficulty, I think, in allowing the above estimate of the slave population of the island."

Schools, Education, &c.—While at Matanzas, Dr. Abbot visited the schools in that city. "I learn," says he, "that schools were first set up under the authority of the Cortes, six years ago;" (this was written in 1828) those liberals being sensible that knowledge and freedom, or general information, and limited monarchy, are yoke fellows. We first entered a high school, kept by subscription. There was a respectable teacher who speaks good English, and is a Spaniard, instructing twenty boys from twelve to eighteen years of age. Latin, English and Spanish are taught in this school. From this apartment we went into a *free* school, supported, as I understand, by the city, and to which the children of the poor have access. In this and the contiguous room there were 150 scholars; they learn reading, spelling, arithmetic and geography. Specimens of writing were shown to us, that would have done honor to any of our schools."

In speaking of the public institutions of Havana, the same interesting and intelligent writer mentions in honorable terms the Insane Hospital, the Lazaretto for lepers, and the Casa de Beneficiencia, or House of Mercy, appropriated to the subsistence and education of orphans and friendless children. "A useful education is given in this institution to two hundred females, and forty boys, and to all except ten, at the expense of the institution. The ornamental kinds of needle work are taught, as well as the more useful, and even music. In the boys' apartment we found the Lancasterian plan adopted. It is remarkable, that females once entered into this establish-

ment, remain as long as they please, or till they are married. If married from the house, they are portioned as daughters of the family, each bride receiving a dowry of $500." In addition to the schools and benevolent institutions above mentioned by Dr. Abbot, there are in Havana one university, two colleges, an academy of drawing and of painting, and 78 schools for both sexes, and a nautical school; but on the whole, though there is evidently an increased attention paid to education in Cuba, still it is lamentably in the rear of its more enterprising and intelligent neighbors; and we heartily join Dr. A. in the wish that "the time may soon come, when it shall be as strange a thing to see a child uneducated in Cuba as in New-England."

Such is briefly the present state of Cuba. As not more than one fourth of the Island is yet under cultivation, and as it is probably capable of supporting a population of some five or six millions of inhabitants, however important she may be to us both in a political and commercial point of view, now she is destined to become infinitely more so. Whatever, therefore, may be her future destiny, whether to remain under the vassalage of an unnatural mother, or to become an independent nation, the citizens of this country can never be indifferent to her fate. We should be glad to hail her as an independent sister, but we wish not to see her suffer the calamities which would, at least, for many years to come, inevitably follow any attempt to throw off the yoke of foreign power.

Pneumatics.

(*Continued from page* 36.)

The ancients were as ignorant of the fact that the atmosphere possesses gravity, as they were of its compound nature. It is curious to observe what trifling circumstances sometimes lead to the developement of the most important facts: that which led to the investigation of the properties of the atmosphere, and the discovery of its *weight*, was the failure of some workmen employed by the Duke of Tuscany, to raise water by means of a pump, above the height of 33 feet. The foreman being surprised at this failure, had recourse to Galileo, the most profound philosopher of the age, who was equally at a loss to account for the fact. It had ever been supposed by philosophers, that the cause of the rise of water in pumps, was *the abhorrence which nature had of a vacuum*, and that consequently, water would rise in a vacuum to any supposable height. Galileo had imbibed this opinion, or rather adopted it, and when called upon to explain why water would not rise above 33 feet in a pump, could give no better reason for it than *the abhorrence which nature had for a vacuum ceased at that distance from the earth*;—a reply as unphilosophical as it was unsatisfactory: he was too much of a philosopher, however, to let a circumstance of this kind pass without investigation, and he immediately set about examining it: in the course of this investigation he was led to believe that the atmosphere had *weight*, but it was left to his disciple, Torricelli, and to Pascal to establish the fact by the clearest demonstrations.

The experiments which these philosophers made were ingenious, and led to the invention of the well-known instrument, the Barometer, which is now used to measure the height of mountains, &c. as well as to indicate the state of the atmosphere. It occurred to Torricelli, that if, as he supposed, and as had been conjectured by Galileo, a column of water will rise in an exhausted tube till its weight shall counterbalance the weight of the atmosphere, or more properly speaking, if the water were raised by the weight of the air, then any other fluid, mercury for instance, would rise in the same tube as much less as its weight should be greater than water: for instance, water, it had been ascertained, would rise between 32 and 33 feet in an exhausted tube, now as mercury is fourteen times heavier than water, consequently it would only rise in the tube about 28 or

29 inches. To test this, he took a glass tube open only at one end, and filled it with mercury; having a basin of the same fluid ready, he placed his finger on the open end of the tube, and placed it upright in the basin, the end stopped by his finger being downwards and immersed in the fluid: he then removed his finger and found his conjectures verified by the mercury sinking in the tube till it stood at about 27½ inches above the surface of that in the basin. From the ingeniousness of this experiment, and the satisfactory manner in which it demonstrated the gravity of air, the tube he used has received the name of the Torricellian.

In addition to this experiment, and to place the subject beyond doubt, another was made by Pascal: if the mercury in the Torricellian tube were supported by the pressure, or weight of the atmosphere, he thought it ought to stand higher or lower according to the length of the columns of the air at the place where the experiment should be made; on the contrary, if the weight of the air had nothing to do with the state of the mercury, then it ought to stand at the same point of elevation at all altitudes. He therefore determined to make an experiment to ascertain this fact; the mountain selected for that purpose was the highest in France, the Puy-de-dome: as the instrument was carried up the mountain, it gradually subsided till on reaching the summit, it stood three inches lower than it did at the base; this result was the same in several trials. This completely settled the question and established the fact, that the higher we rise from the level of the sea, the less is the pressure or weight of the atmosphere, and that this pressure diminishes in a certain uniform ratio, a knowledge of which fact suggested to Boyle the application of the Torricellian Tube, or Baromometer, to measure the heights of mountains, &c. for which purpose, as before observed, it is now generally used.

But there is another, and, perhaps, more satisfactory method of showing that air has weight, namely, by actually weighing it. Take a glass bottle, of any size, though the more it will hold in proportion to its weight, the better; to the neck of this, fit a stop cock, then having by means of an air pump (which will be explained hereafter) exhausted it of air, turn the cock, and place it upon the scale of a balance; having nicely adjusted the balance, turn the cock again, and let in the air: the scale in which the bottle is placed, will now preponderate, and will require an additional weight in the opposite one to restore it to a level: this additional weight will be found on

examination to be just equal to 523 grains for every cubic foot the bottle contains, or in that proportion. Now since a cubic foot of water weighs 1,000 ounces, it is proved by this experiment, that air, not only has weight, but that it is only 840 times lighter than water; that is, that 840 cubic feet of it, will weigh as much as one cubic foot of water.

There are many circumstances that excite our curiosity, and sometimes wonder, that are easily accounted for, on the principle of atmospheric pressure: for instance, it may appear wonderful to us, how flies and other insects, can adhere to the under-surface of a pefectly hard and highly polished substance; this would, indeed, be impracticable, were it not that nature having given them the power of forming a vacuum between their feet and the surface, they are sustained by the external pressure of the atmosphere upon their feet. So again, there are some kinds of shell fish, that can attach themselves, in the same way to rocks so strongly, as almost to defy the efforts of man to remove them; having formed a vacuum between themselves and the rock, the power which holds them to it, is nothing more than the pressure of the surrounding air upon them.

The density of the atmosphere, gives it the power of refracting and reflecting the rays of light that enter it. Were it not for this power, we should be involved in chaotic darkness, the instant the sun sunk below the horizon, or a cloud intervened between us and his disc. It is to the multiplied reflections, which the rays receive in the atmosphere, that we are indebted for the light we enjoy in a cloudy day; for the mild radiance of the morning dawn, and for the sober shade of "twilight grey, when comes still evening on." Were there no atmosphere, therefore, or were it as rare and attenuated, as it is supposed to be, at the height of 20 or 30 miles, even supposing it possible for us to exist, our abode here, would be dark, dreary and comfortless, and our existence not worth supporting.

When a ray of light passes from a rarer, into a denser medium, as from vacuity into air, or from air into water, glass, &c., it is bent out of its course, this is called refraction; and if the medium through which the ray passes, continues to increase in density, the refraction will also continue to increase; this is the case with the atmosphere, hence a ray passing from the sun to the earth is bent out of its course, the moment it enters the atmosphere, and is continually bent till it reaches us; for this reason the apparent altitude of the sun, moon and stars, is greater than their actual elevation, and hence we

see them before they are actually above the horizon, and after they have sunk below it. The manner in which the rays of light are refracted may be seen by a very simple experiment. Take an empty bowl, and having placed a piece of money in it, retreat gradually from it until the money is entirely hid from your eye, by the rim of the bowl; then let a person pour water into it; in a moment, the money will begin to be visible, and will soon appear to be considerably raised in the bowl. Every one has observed that in placing a stick in an inclining position in the water, it appears to be bent from where it enters it; this also is owing to the refraction, or bending of the rays of light as they pass from the air into the water.

But the rays of light, in passing from the sun to the earth, are also subject to other modifications from the atmosphere, and the vapours which it contains. It may be necessary to remark, that a beam of white light is composed of several different colored rays, and that the power or momentum of some of these, as the red, orange, &c. is greater than that of the others, such as the blue, violet, &c. Now when the sun approaches the horizon, his rays pass through a long tract of atmosphere, and in their course encounter considerable resistance, which the red or more powerful rays only are able to overcome, the blue and violet being absorbed or reflected; hence the ruddy and gorgeous coloring of the clouds at the rising or setting of the sun, and the sometimes brazen face of the modest moon.

To the circumstance of the blue rays' being absorbed or reflected in their passage through the atmosphere, is the color of the sky, and the azure tints of the distant mountain tops attributable; for on ascending into the more attenuated strata, which offer no resistance to the passage of these rays, the sky has been uniformly observed, by æronauts, to become darker and darker till it assumed the color of deep black; and such also is its appearance represented to be by Saussure and others, who have had the opportunity of observing it from the top of Mont Blanc.

We have before stated the atmosphere to be composed of twenty-one parts of oxygen, and seventy-nine parts of nitrogen: it is by means of the former ingredient that it supports both animal life and combustion. A healthy person ordinarily inhales about 40 cubic inches of air at each respiration; 197 gallons per hour, and 75 hogsheads per day. On examining the air that has been expired from the lungs, it is found to have lost a considerable part of its oxygen,

and to have acquired a considerable portion of carbonic acid, which is destructive of animal life; hence it is very unwholesome to frequent tight and crowded rooms, where the oxygen is soon exhausted and the air becomes noxious by the carbonic acid expired. The amount of oxygen ordinarily consumed by a person in twenty-four hours, has been ascertained, by the experiments of Lavoisier and Sir H. Davy to be about 46,000 cubic feet.

But although oxygen is the great supporter of animal life, it can only be inhaled in moderate quantities and in a diluted state; in any other way it is one of the most destructive agents in nature: combined with nitrogen, 37 parts to 63, that is, 37 parts of oxygen to 63 of nitrogen, it forms nitrous oxyde gas, commonly known by the name of exhilarating gas, from its intoxicating effect upon those who inhale it, a small portion of which may be respired without material injury, though its effect is similar to that of any other powerful stimulus. But who could imagine that the same ingredients that compose the mild and salubrious fluid which we are constantly inhaling, and without which we should instantly expire, could be so combined as to form a substance so totally different from it as that most powerful acid, aqua-fortis! and yet this acid is nothing more than oxygen and nitrogen, combined in proportions the reverse of those which form atmospheric air; namely, 79 parts of oxygen and 21 parts of nitrogen! Who can contemplate this fact, and not admire the wisdom of that Being who has thus prepared for us "the breath of life" out of substances in themselves so powerful and destructive, and which we can combine and use for other and useful purposes! That it is the oxygen of the atmosphere that supports combustion, may be proved by several experiments. If a candle be placed under an exhausted receiver it will instantly expire; if it be placed under a receiver not exhausted, it will continue to burn for a short time, when it will go out, and if the remaining air be examined, it will be found to have lost all its oxygen. If a candle and a mouse be placed under the receiver together, both will in a short time expire; but if some pure oxygen be introduced under the receiver after the mouse begins to struggle, and the candle to burn dim, both will immediately revive and appear as lively as ever, till it is again exhausted. This experiment not only shows that oxygen is essential to the support both of animal life and combustion, but that one cannot exist where the other expires; a knowledge of which fact is extremely important

as it will enable any person about to descend into a well, cave, or other place where impure air is often collected, to ascertain whether he may do so with safety. If, on letting down a candle or torch it continues to burn, there is no danger; but if, on the contrary, the flame be extinguished, death would be the inevitable consequence should the person persist.

(*To be Continued.*)

INSTINCT.

(*Continued from page* 50.)

In supplying the place of reason, instinct is perpetually assuming its semblance. Let us take an example or two from both the animal and the vegetable world.

In order that the seeds of plants should produce and perfect their respective kinds, it is necessary that their shoots should rise to the surface of the earth to enjoy the benefit of light and air. Now in whatever direction the eye of a seed, from which germination first radiates, is placed, these shoots ascend equally to the surface, either in curved or straight lines, according as such ascent may be most easily accomplished. Mr. John Hunter sowed a quantity of peas and beans with their eyes placed in different directions, in a tub, which he afterwards inverted, so that the bottom was turned uppermost, while the mould was prevented from falling out by a fine net. And in order that the under surface might possess a superior stimulus of light and heat to the upper, he placed looking-glasses around the mouth of the tub in such a way that a much stronger light was reflected upon the inverted mould than that of the direct rays of the sun; while at the same time, he covered the bottom of the tub with straw and mats to prevent the mould, in this direction, from being affected by solar influence. Yet the same instinctive law of ascent still prevailed. After waiting a considerable length of time, and perceiving that no shoots had protruded through the lower surface of the mould, he examined the contents of the tub, and found that they had all equally pressed upwards and were making their way through the long column of mould above them, towards the reversed bottom of the vessel; and that where the eyes had been placed downwards, the young shoots had turned round so as to take the same direction. As one experiment leads on to another, he determined to try the effect of placing other seeds of the

same kind in a tub, to which a rotatory motion should be given, so that every part of it might be equally and alternately uppermost, and the seeds should have no advantage in one direction over another. Here, as we often behold in other cases, the instinctive principle of accommodation was baffled by a superior power, and the different shoots, instead of ever turning round, uniformly adhered to a straight line, except where they met with a pebble or any other resistance, when they made a curve to avoid such obstruction, and then resumed a straight line in the direction into which they were thereby thrown, without ever endeavoring to return to the original path.

"When a tree, which requires much moisture, (says Mr. Knight) has sprung up or been planted in a dry soil, in the vicinity of water, it has been observed that much the larger portion of its roots has been directed towards the water; and that when a tree of a different species, and which requires a dry soil, has been placed in a similar situation, it has appeared in the direction given to its roots, to have avoided the water and moist soil."

"When a tree, (remarks Dr. Smith) happens to grow from seed on a wall, (and he particularly alludes to an ash in which the fact actually occurred,) it has been observed, on arriving at a certain size, to stop for a while and send down a root to the ground. As soon as this root was established in the soil, the tree continued increasing to a large magnitude."

The best means, perhaps, that a plant can possess of resisting the effects of drought, is a tuberous or bulbous root. The grass called phleum *pratense*, or common catstail, when growing in pastures that are uniformly moist, has a fibrous root, for it is locally supplied with a sufficiency of water; but in dry situations, or such as are only occasionally wet, its root acquires a bulbous form, and thus instinctively accommodates the plant with a natural reservoir. And there are various other grasses, as the alopecurus *geniculatus*, or geniculate foxtail, that exhibit the same curious adaptation.

Instinct may therefore be defined to be the operation of the principle of organized life by the exercise of certain natural powers directed to the present or future good of the individual; and reason, the operation of the principle of intellectual life, by the exercise of certain acquired powers directed to the same end. Both equally answer their object, are equally perfect in their kind, and equally display their common origin.

Instinct, however, has as often been confounded with *feeling*, or *sensation*, as it has with *perception*, which is the outline or foundation of reason: and hence another source of those perplexities and errors in distinguishing between animal and vegetable life—perplexities and errors which have been productive of the most absurd and disgusting consequences, and especially in regard to the delicate and elegent science of botany.

Instinct, sensation, and perception, are all principles essentially different; they may, indeed, exist conjointly, but each of them is capable of existing separately. Instinct is the common law or property of organized matter, as gravitation is of unorganized; and the former bears the same analogy to sensation and perception as the latter does to crystalization and chemical affinity. Instinct is the general faculty of the organized mass as gravitation is of the unorganized mass; sensation and perception are peculiar powers or faculties appertaining to the first, as crystalization and affinity are appertaining to the second; they can only exist under certain circumstances of the organized or unorganized matter to which they respectively belong.

Whence derive the young of every kind a knowledge of the peculiar powers that are to appertain to them hereafter, even before the full formation of the organs in which those powers are to reside? To adopt the beautiful language of the first physiologist of Rome,

> The young calf whose horns
> Ne'er yet have sprouted, with his naked front
> Butts when enrag'd: the lion-whelp or pard
> With claws and teeth contends, ere teeth or claws
> Scarce spring conspicuous: while the pinion'd tribes
> Trust to their wings, and, from th' expanded down
> Draw, when first fledged, a tremulous defence.

In like manner an infant, in danger of falling from its nurse's arms, stretches out its little hands to break the fall, as though acquainted by experience with such an action. We here meet with an instance of pure instinct; but we pursue the same conduct in adult age, and we have then an example of instinct combined with intelligence; and intelligence, instead of opposing the instinctive exertion, encourages and fortifies it. So when caterpillars, observes Mr. Smellie, are shaken from a tree, in whatever direction they descend, they all instantly turn towards the trunk and climb upwards, though till now they have never been on the surface of the ground.

The vegetable kingdom offers us examples of simple instinct equally singular and marvellous. Thus the stalk of the convolvulus twines from the left or east by the south to the west, the face being towards the south: the phaseolus *vulgaris*, or kidney bean, pursues the same course: while the honey-suckle and the hop take a perfectly reverse direction. Who will reveal to us the cause of these differences?

Let us close these observations with a momentary glance at the very singular instinctive powers of the cancer *ruricola*, or land-crab. This is an inhabitant of the tropical regions, and especially of the Bahama islands: it is gregarious, and associates in large bodies that preserve an orderly society, for the most part, in the recesses of inland mountains, though they regularly once a year march down to the sea-side in an army of some millions to deposit their spawn in the ocean. The time selected for this expedition is usually in the month of May, when they sally forth from the stumps of hollow trees, the clefts of rocks, and subterraneous burrows, in enormous multitudes. The whole ground, indeed, is covered with this reptile band of adventurers; and no geometrician could direct them to their destined station by a shorter course. They turn neither to the right hand nor to the left, whatever be the obstacles that intervene; and if they meet with a house they will rather attempt to scale the walls than relinquish the unbroken tenor of their way. Occasionally, however, they are obliged to conform to the face of the country; and if it be intersected by rivers, they pursue the stream to its fountain head. In great dearth or rain they are compelled to halt, when they seek the most convenient encampment, and remain there till the weather changes. They make a similar halt when the sun shines with intense heat, and wait for the cool of the evening. The journey often takes them up three months before they arrive on the sea coast; as soon as they accomplish which, they plunge into the water, shake off their spawn upon the sands, which they leave to nature to mature and vivify, and immediately measure back their steps to the mountains. The spawn, thus abandoned, are not left to perish: the soft sands afford them a proper nidus; the heat of the sun and the water, give them a birth; when millions of little crabs are seen crawling to the shore, and exploring their way to the interior of the country, and thus quitting their elementary and native habitation, for a new and untried mode of existence. It is the marvellous power of instinct that alone di-

rects them, as it directed the parent hosts from whom they have proceeded; that marvellous power which is co-extensive with the wide range of organic life, universally recognised, though void of sensation; consummately skilful, though destitute of intelligence; demanding no growth or developement of faculties, but mature and perfect from its first formation.

The general corollary resulting from these observations is as follows: that instinct, as I have already defined it to be, is the operation of the principle of organised life by the exercise of certain natural powers directed to the present or future good of the individual; while reason is the operation of the principle of intellectual life by the exercise of certain acquired powers directed to the same object: that it appertains to the whole organized mass, as gravitation does to the whole unorganized; equally actuating the largest and smallest portions, the minutest particles and the bulkiest systems; every organ and every part of every organ, whether solid or fluid, so long as it continues alive: that, like gravitation, it exhibits, under particular circumstances, different modifications, different powers, and different effects; but that, like gravitation, too, it is subject to its own division of laws, to which, under definite circumstances, it adheres without the smallest deviation; and that its sole and uniform aim, whether acting generally or locally, is that of perfection, preservation, or reproduction.

Of this mode of existence we know nothing: but as little do we know of the principle of gravitation of mind. We can only assure ourselves that they are distinct powers, perhaps distinct essences; and we see them acting, as well separately as conjointly, for the general good. Under their accordant influence we behold the plastic and mysterious substance of matter, which we must be especially careful not to confound with themselves, rising from "airy nothing" into entity: ascending from invisible elements into worlds and systems of worlds; from shapeless chaos and confusion, into form, and order, and harmony; from brute and lifeless immobility, into energy and activity; into a display of instinct, feeling, perception; of being, and beauty, and happiness. One common design, one uniform code of laws, equally simple and majestic, equally local and comprehensive, pervades, informs, unites, and consummates the whole. The effect then being one, the mighty cause that produced it must be one also; an eternal and infinite unity—the radiating fountain of all possible perfections—ever active, but

ever at rest—ever present, though never seen—immaterial, incorporeal, ineffable: but the source of all matter, of all mind, of all existences, and all modes of existence. Whatever we behold is God—all nature is his awful temple—all sciences the porticoes that open to it: and the chief duty of philosophy is to conduct us to his altar; to render all our attainments, which are the bounteous afflations of his spirit, subservient to his glory, and to engrave on the tablet of our hearts this great accordant motto of all natural and all revealed religion, of Athens and of Antioch, of Aratus and of St. Paul, "in him we live, and move, and have our being."

Agriculture.

OF HEMP.

Within a few years past, the attention paid to the growing of this article, and the amount raised in this country, has greatly increased, and is still increasing; indeed, we see no reason why we may not produce it in sufficient quantities to supply the domestic demand, if not for exportation—it is an article that requires rich soil, but where can there be found a soil more productive than that which borders our western streams? There are millions of acres, in the United States yet, in a state of nature, than which, no land in the world would produce a more abundant crop, or would require less labor to cultivate. As the culture and management of this article is as yet very imperfectly understood, the following account of the mode of raising and preparing it for market in Russia, may not be unimportant to our western farmers.

In Russia, Hemp is sowed in May; it requires the best soil, which, if cold and clayey, is well manured: it is a plant of rapid growth, usually attaining its full height by the 20th or 25th of July, and ripening by the first of September. When quite young, it is often and carefully weeded. When ripe, it is pulled and tied up in bundles of from 30 to 40 stalks each, and set under sheds built for the purpose, under which it is dried on kilns, and thrashed.

The next process is the rotting. The hemp is rotted in bundles, the same in which it was first tied up, in the month of October; if possible it should be rotted in soft, pure, running water, as this kind of water gives it a much whiter color than the water of ponds and ditches. The bundles are kept down by stones and logs: stones are preferred, as they do not impart any color to the hemp: in this situation it is suffered to remain for fifteen or twenty days, when it is taken out, (provided it be sufficiently rotted, and to prevent its being too much so, it must be often and carefully examined) the bundles loosened, and spread in the open air, in a situation where it will be fairly exposed to the wind and sun. After remaining a few days in this situation, it is again taken up and dried on the kiln, after which it is braked, though this is not usually done till Spring. There are various kinds of hemp in Russia, each deriving its variety

from the different manner in which it is prepared. For instance, there is the *Long Staple*, so called, because it is dried, thrashed and braked in its natural state, neither the tops or roots being cut off: there is another kind called the *Winter Hemp*, because it is braked in the winter, and is the least valuable, for the reason that it cannot be so dry, is more subject to heating, will lose in weight, and is not so smooth and good, but curls and has a bad smell. The dampness of the winter air prevents its becoming as dry as the Spring hemp, even when dried in sheds and on kilns, as it always is both in winter and spring. The *Spring Hemp* is that which is braked in the months of April and May; indeed, hemp is never dressed in any other months, except by those whose necessities oblige them to hasten their crop into market, and to accept a reduced price for it. There is another kind of hemp called the *Short Staple*, so called from the tops and roots being cut off before it is braked. In case the Hemp is not sufficiently rotted it is impossible to clean it properly, and its thread will always be rough, in this case it is called Presooshka, and runs into the 2d and 3d qualities: on the contrary, if it be too much rotted, the thread is weakened, and it is, of course, of an inferior quality.

"The best Hemp," says the document from which we have gathered our information, "is cultivated in the Government of Churnigoff. In this goverment the Hemp is, for the most part, of the short staple and of the very best quality; it produces about 800,000 poods.* In the government of Ord, the greater portion produced is of the long staple, and amounts to 800,000 poods.

In the Government of Kourk the Hemp is principally of the long staple: the amount is about 700,000 poods. The Government of Toola also produces about 500,000 poods, principally of the long staple.

In the Governments of Tamboff and Rizan, there are about 800,000 poods raised. In these governments (and in these only) the hemp is rotted in the Spring, and its color is as light as flax. In the Government of Smolensk, the greater part of the crop, which amounts to about 500,000 poods, is of the short staple; as it is also in the Government of Calauga: the amount produced in this latter is about 400,000 poods.

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* A pood is 36 pounds.

A Desiateen* of good land will produce about 40 poods of Hemp; if the crop be abundant, it may amount to 50 poods per desiateen of raw, or undressed Hemp. The whole amount of Hemp produced in the Empire, annually, it would appear from the above statement, (which is taken from a Russian paper) is about 4,500,000 poods.

It may be well to state, for the information of those who may apprehend that the increasing attention given to the cultivation of this plant in this country, and the consequent increase of the amount raised here, may result in over stocking our market, that the value of Hemp, Cordage, &c. imported into the United States, during the year ending 30th September, 1828, was $1,654,540; and the value of that imported during the year ending 30th September, 1829, was $1,011,840: whereas, the value of the domestic production cannot exceed half that sum.

SUN FLOWER OIL.

Sun flower oil has been used in some parts of the country for table oil, in the place of olive, or sweet oil, which is imported, and which it is said to equal in flavour and clearness.

The amount of olive oil imported into the United States, last year, was 95,809 gallons, and the amount re-exported, 26,400 gallons; consequently the amount consumed was 69,409 gallons: now, if sun flower oil will answer the same purpose, we see no reason why the money paid for this, might not as well be pocketed by our farmers, as by the Italians, Egyptians, and Turks. We recommend this subject to their attention.

The following letter gives an account of the manner of its cultivation, product, uses, and value.

"The sun flower is cultivated like Indian corn, planted in rows —the rows three feet apart and stalks eighteen inches.

"Any land which produces corn will yield from 50 to 70 bushels per acre, and it is worth 75 cents a bushel.

"The single headed kind is preferable, and as soon as ripe, which is known by its shattering, the heads are taken off, carted to the barn floor, and immediately thrashed out with the flail; it should be

* A Desiateen is about the 30th part of an acre.

cleaned with the wind mill, [or fan we suppose,] and then spread out, and occasionally turned or stirred to become dry; if left upon a large heap it may mould.

"By an improved mode of extracting the oil, a bushel of seed yields a gallon of oil—three quarts cold pressed, and one quart by heating. The cake when ground is very nutritive, as cattle-feed, and will pay the expense of the miller.

"The oil used as a purgative appears to have the same effect as castor oil, without the nausea.

"A bushel of seed will plant about 10 acres. I can furnish any gentlemen disposed to cultivate with the best seed. I expect to raise about 500 bushels this season, and have engaged others in raising probably as much more.

CHAS. A. BARNITZ."

In addition to the remarks of Mr. Barnitz, it may be observed that this plant will grow in places where a farmer would not think of putting any thing else, as in the door yard, barn yard, by the side of fences, and in fact any where, where the seed may chance to be dropped, and that without any labor in cultivating it. Heretofore it has been planted merely for its beauty; there is now another motive to cultivate it—its *utility*.

CHEESE.

Our Farmers will perhaps be a little surprized to learn, that, of an article which they can furnish an almost unlimited quantity, there was imported into the United States, from foreign countries, during the year 1829, 177,536 pounds, costing at the places from whence imported, $17,177. Now, if to the original cost we add the duties, nine cents a pound, and two and a half cents a pound for freight, insurance and profits, it will appear that $37,593 were paid by the people of this country, during the last year, for *foreign* cheese. This sum divided among our dairy women, would buy a good many little nice things for their children, besides, perhaps, a new calico gown for themselves—that is, if they did not make their sleeves *too* fashionable.

The truth is, and we wish them to be convinced of it, that in the manufacture of this article, our farmers have yet much to learn; there is no doubt but they can make as good cheese as that which is imported, but until they *do*, they cannot expect to monopolize the market.

The two kinds most esteemed in England, from whence we import a good deal, are the *Cheshire* and the *Stilton:* the following recipes for making these two kinds, are taken from Loudon's Magazine, an excellent agricultural work.

"*Cheshire cheese* is made from the whole of the milk and cream, the morning's milk being mixed with that of the preceding evening, previously warmed."

"*Stilton cheese*, which, from its peculiar richness and flavour, is called the parmesan of England," says the same author, "is made in the following manner:—the night's cream is put to the morning's milk, with the rennet; when the curd is come, it is not broken, but taken out whole and put into a sieve to drain gradually; while draining it is gently pressed till it becomes firm and dry, when it is placed in a vat or box, made exactly to fit it; as it is so extremely rich, that without this precaution, it is apt to bulge out and break asunder. It is afterwards kept on dry boards, and turned daily with cloth binders around it, which are tightened as occasion requires. After being taken out of the vat, the cheese is closely bound with cloth till it acquires sufficient firmness to support itself: when these cloths are removed, each cheese is brushed over every day for two or three months, and if the weather be moist, twice every day; the tops and bottoms are treated in the same manner daily before the cloths are taken off. Sometimes these cheeses are made in a net which gives them the form of an acorn, but these are not so good as those made in vats. It is not considered sufficiently mellow for cutting till it is two years old. Wine is said to be sometimes added to the curd in order to hasten the ripening of the cheese, and add to its moisture.—*Good's Book of Nature.*

HINTS TO FARMERS.

The two most essential requisites of successful husbandry, are, *labor* and *manure*. The greater part of our farmers attempt to cultivate too much land, and the consequence is, they only do it by halves. One hundred acres of land, properly tilled and manured, will produce a larger crop of any thing, no matter what, than two hundred acres will, with the manure and tillage usually given to it in this country, and the profit it will yield, will be much greater.

When we say to our farmers, "you do not sufficiently manure your ground," they will probably reply, "we put on all we have, and what can we do more?" we will tell you; take more pains to make and save it:—when your stock is stabled, never fail to litter them abundantly with coarse straw, stalks, and other things which they will not eat; for this purpose it would not be amiss, before the setting in of the winter, to collect all the leaves, weeds, &c. which you can, and lay them in a heap to be used as you may want them for litter; in this way they would considerably augment the amount of manure you would have in the spring.

Never suffer your cattle to roam about and waste their manure in the road, or in a stream of water, but keep them in a yard during the day in the winter, and during the night in the summer. In the morning, through the summer months, collect in heaps what has been made during the night, and cover it over with loam; throw it into the same heap every morning till it is as large as you think proper to make it—if you can throw on a parcel of weeds occasionally they will help to concoct, and enrich the whole. If it can be done conveniently, it will be better in all cases, both in winter and summer, to protect your manure from the rain which carries off much of its strength.

Farmers generally allow their hogs to run at large in the road; this is not economy: it is surprising how much manure hogs will make when confined and properly attended to; they should be kept in a yard and constantly supplied with weeds, straw, and any thing in fact, that will make manure; even a load or two of loam, occasionally, would not be amiss, as it would soon become extremely rich and could be carried away whenever wanted, and its place supplied with more.

By pursuing this course one year, the farmer would find his stock of manure, which he ought to consider as valuable as money, greatly increased, and in a few years his farm much more productive: cultivate *two thirds* only, of the land you now till, and put *double* the quantity of manure on it, (and you could do so if you follow our directions) and our word for it, you will raise more grain, cut more hay, and gather more potatoes, from that two thirds, and with considerable less labor, than you now do from the whole.

In conclusion, we will add one more hint; every thing that grows on your farm, trees and shrubbery excepted, should either be used or turned into manure.

BOTS IN HORSES.

The injury which these worms occasion to horses is, perhaps, not so great as is sometimes supposed. Every horse that pastures in the open field is liable to be attacked by them, but it is probable that the damage they cause to animals, otherwise in a sound condition, is not very material, since naturally their duration in the stomach of the horse is not very long. They are very difficult to dislodge when they have once taken possession, and it is doubtful whether any remedy has yet been discovered to destroy them without, at the same time, injuring the health of the horse. They are so tenacious of life, that they will live in any thing which the animal can contain in his stomach.

The manner in which they deposit their eggs is a singular instance of instinct. The fly, which resembles a bee in appearance, settles on the forepart of the horse, on his legs, shoulders, or other parts within the reach of his mouth, and attaches the eggs by a glutenous substance, to the hair; these, when hatching, cause an irritation or itching, and the horse, in licking the part with his tongue, carries the young worm into his mouth and swallows it.

The bot adheres to the inside of the stomach by means of two strong hooks at his lower extremity, and feeds on the chyle which is contained in this place. After remaining in this state for a proper season, he is passed by the horse in the natural way, and his transformation to the perfect fly soon afterwards takes place. To compel him to leave his position in the stomach, by any means which would not endanger the horse, is almost impossible. Several remedies, however, have been recommended, some of which might occasionally be found efficacious—among these an injection of lime water is mentioned; soot, common salt, and linseed oil, are said to be good, and the use of strong cathartics. Horses should be frequently examined to see if any nits are deposited on their foreparts, which should be carefully scraped off.

MILDEW.

This disease, which is so injurious to plants, in preventing the ripening of fruit, is either a kind of fungus, or else the affection ul-

timately ends in the attachment to the part disordered of a fungus. When a mildewed leaf or fruit is examined by a microscope it is found that a minute web, somewhat resembling a spider's web, is the ground on which are thickly sewn very small globular bodies. It is probable from the situations of the plants which are most liable to attacks of this disease, that moisture and shade are very conducive to its growth. The Lilac in our gardens is almost always effected by it; shrubs of other kinds and the grape vine are frequently subject to it. These low growing plants are generally placed in the shade of trees or trail near the ground, and the under side of the leaves and fruit are the parts usually affected. Those parts which are exposed to the influence of the sun, and a free circulation of the air, are rarely, if ever, injured by mildew. Bunches of grapes which are thickly clustered together, will frequently have their interior berries covered by this fungus, the outside ones which are open to the air and light being uninjured. It is difficult to find a remedy against a disease of this character, which, perhaps, may be connected with the peculiarities of our climate. More attentive observation of the manner in which it commences its attacks, the circumstances attending its appearance, the exposure and situation of the plants which are most liable to its effects, are all necessary before effective means can be employed to prevent or remedy it. If the facts which have been observed to be true in some particular instances that a stagnation of moist air around them, and influence of shade from being too near the ground, were to be assumed as the causes, the remedy could not be difficult, since it would be sufficient to train to a considerable height above the ground the vines, or other low growing shrubs, so as to let them enjoy the full influence of the light and heat, and to thin the leaves when they are too thick, or spread them so that the fruit may have a full exposure, and to cut out the interior berries from such bunches as are too thickly clustered for the whole to ripen. We recommend to gardeners, whose fruits are attacked by this destructive affection to notice, minutely, all the circumstances which we have mentioned, and what other particulars relate either to those which are thus effected, or to such as happen to escape from it.

Natural History.

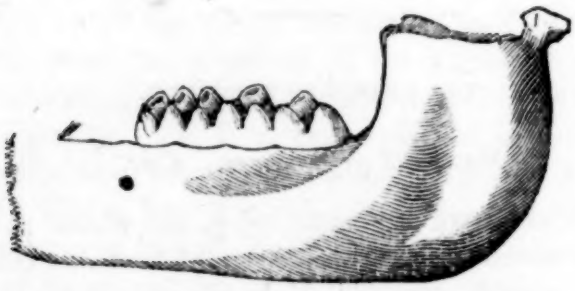
THE AMERICAN MAMMOTH.

Mastodon giganteum. Cuv.

The climate which we at present enjoy, and which varies in the course of the seasons from the extremes of heat and cold, at one period of the creation, was identical with, or nearly resembled in temperature the tropical regions of the present day; a fact for the evidence of which we are indebted to the researches of geologists. At various depths below the surface of the earth the remains of numerous generations, both of animals and plants are met with, which no longer exist on its exterior. Some of these have perished without leaving any of their own kinds to maintain their succession; while others are represented, at least generically, by tribes which, however, frequent a latitude entirely different from that which they originally inhabited. The tremendous catastrophe that overwhelmed the gigantic race oi quadrupeds which formerly ranged through every section of our territory, not only extinguished the entire brood, but rendered their former residence unfit for beings of their form and habit. The chief representatives of this huge creation were the Elephant and Mammoth, both of which in primeval ages were inhabitants of our soil. The former, or his congeners, have continued their generations from the earliest periods in other climates, while nothing but the buried bones of the latter remain to prove that he ever formed part of the creation. Elephant's bones, though not so common as those of the mammoth, are occasionally found in New-Jersey, in Maryland, Virginia, and West of the Alleghanies in Ohio, Kentucky, and Louisiana. The species, however, is entirely different from any that are known to exist in the present day.

The name of mammoth is improperly applied to this animal, as that term belongs to the species of Russian elephant so famous for having been found with his entire carcase frozen in the ice of Siberia. Cuvier, who first settled his place in the system of allied ani-

mals devised for him the name of *mastodon*, intended to designate the peculiar structure of his molars or jaw teeth, the character-



istic by which he is chiefly to be distinguished. Their teeth have their crowns furnished with conic or mamillated processes. The figure above contains a jaw with two of these teeth, one of which has three, and the other four pair of these conic protuberances. They vary in number according to the age of the animal, and their position in the jaw bone.

The discovery of the mastodon was an occurrence which formed a new era in the science of fossil geology, as being one of the first evidences of the former existence of a quadruped of which not a single individual, according to any creditable testimony, is known to have survived. When his enormous teeth were first presented to the amazement of his discoverers, he was supposed to have been some huge carnivorous monster, and their imaginations were excited by speculations on the destruction which a creature of his bulk and corresponding force and velocity must have occasioned among the various animals which formed his prey—but when a comparison had been made of his skeleton with that of other species, the form of his teeth, tusks, the bones of his feet and other parts were found to approach the structure of the elephant. There is little doubt, therefore, that he nearly resembled that animal as well in his conformation as in his mode of life. His bulk was little larger than that of the modern elephant, though his body was longer in proportion, and his limbs of greater thickness. His food probably consisted of roots and fleshy vegetables such as abound in soft marshy grounds. From the ponderous dimensions of his head, and the corresponding shortness of his neck, he must have been provided with a proboscis to convey his food to his mouth.

The remains of mastodons are now found in many different quarters of the globe, and always under the same circumstances beneath the surface of the earth. Up to the present time no less than seven distinct species have been enumerated of this remarkable family of quadrupeds. Only one of them, however, is peculiar to our continent; and in the antediluvian periods in which he lived, he must have been very common over the whole country, particularly in the middle and southern sections. It is a singular circumstance with regard to the nature of the bones which have been detected, that they have undergone no change in substance, the surface of them only being altered by the iron or other matters contained in the mud, in which they are imbedded. On being subjected to chemical analysis their gelatine is found to remain entire, and a jelly has been prepared from them but little inferior in flavor to the same article obtained from recent materials.

The first account of the appearance of the fossil mastodon was published by Cotton Mather, in 1712, some bones having been discovered before that time near Albany. He imagined they belonged to a race of gigantic men of former ages; a supposition that has often been made with respect to the teeth of Elephants, which had from to time been discovered in various parts of Europe. Some time after this, a French gentleman by the name of Longueil, discovered the celebrated locality of Big Bone Lick, in Kentucky, near the Ohio, which has since been so frequently explored for its immense deposit of these ancient relics, and many specimens were sent from thence to Europe—all these specimens however consisted of detached fragments and parts of the skeleton, principally of the teeth. It was not till 1808, that an entire skeleton, or at least a nearly perfect one, was obtained by Mr. Peale, the founder of the Philadelphia Museum, from a marle pit near Newburg and other places in Orange and Ulster counties of this state; and a sufficient number of these bones was procured from those places to make up two nearly complete skeletons, the parts which happened to be deficient being supplied by artificial imitations. From that period various other localities have been discovered where these remains are deposited, and at a moderate computation not less than 50 different individuals have been traced in various parts of the United States. In 1817, some very perfect specimens of a full grown animal were dug up at Chester, near Goshen, in Orange county, and were removed to the

Cabinet of the Lyceum of this city. The lower jaw bone measured 34 inches between the two extremities. It contained two molar teeth as represented in the figure. The tusks were measured in the position in which they were found, and extended to nine feet in length. A great part of them crumbled to pieces on attempting to remove them. In 1823, information was communicated to the Lyceum of Natural History of a mammoth tooth having been discovered in Monmouth County, New-Jersey, about three miles S. W. of Long Branch—a party of members of that institution proceeded to the spot, and succeeded in detecting a skeleton, the greater part of which was found lying in one position in the mud. Such of the fragments as could be preserved were collected, and now form a part of the rich cabinet of the Lyceum.

Hitherto no indications appear to have been observed of the existence of more than one species of the mastodon on our continent. Recently, however, a fragment has been disinterred from near Goshen, the spot from whence the skeleton of Mr. Peale was obtained, which, from some differences in its structure from similar parts of other skeletons, has given rise to the belief that another species or even a genus different from the gigantic mastodon inhabited our territory. The fragment consists of part of the skull containing parts of the two jaw bones, the lower one of which was furnished with an incisor tooth, and the socket of another which was lost. The upper jaw contained two short tusks. The remarkable circumstance of the presence of two incisors in the lower jaw, which had not been noticed in any of the skeletons hitherto discovered, together with some differences in the molar teeth, induced Dr. Godman to suppose that the fragment belonged to a species different from any other of the mastodon family, and that it should therefore form a new genus intermediate between the mastodon and hippopotamus, and he accordingly named it *Tetracaulodon*, from its four incisor teeth, i. e. two in each jaw. An attentive examination, however, of all the peculiarities of structure of these bones, has led to an opinion that the jaw belongs to a young individual of our great mastodon. This opinion is due to Mr. Cooper, who announced it to the Lyceum, shortly after the bones were exhibited in the Museum of Mr. R. Peale, of this city. In detailing his reasons for this conclusion, Mr. Cooper states, that the presence of incisors, as well as false molars, is a common circumstance in the young animals of this

class, particularly the Rhinoceros, Elephant, Hippopotamus, and other kinds; and that their young or milk teeth, drop out as the animal becomes adult, and their place is never supplied. The horse, as is well known, loses a tooth which is never afterwards renewed. The morse or walrus, has four incisors in youth in the upper, and two in the lower jaw. Those in the lower jaw, and two in the upper are shed while the animal is yet young, and are not replaced. The other differences in the size and number of conic points in the molars are accounted for on the same principle of the different system of dentition in such animals according to their different age. The opinion of Mr. Cooper on the identity of these bones appears to be supported as well by the analogy of similar animals, as a comparison with the several specimens which are deposited in different cabinets in this city.

A second species of the mastodon is found in Europe, and is of a smaller size than the American species, probably one third less. The teeth which are discolored with the blue tinge of the iron contained in the mud in which they are deposited, gives them the appearance of gems, and they are known by the name of Turquoise. They are found at Simorre, a town in one of the southern departments of France, and also in Germany, Switzerland, and Tuscany. The same species also occurs in South America. The molar teeth are narrower comparatively than the other kind, and hence its name *M. angustidens*. Europe has also another species among its antediluvian inhabitants, still smaller than the preceding, which from its similarity to the dentition of the Tapir of South America, was called *M. Tapiroides*. Near Conception, in Chili, a single tooth of a species was found by Humboldt, the celebrated traveller, which was named after him *M. Humboldtii*, and in the kingdom of Quito, another tooth was discovered by the same naturalist belonging to a distinct species or mastodon of the Cordilleras, *M. Cordillerarum*.

The East Indies, also, the country of the Elephant, was formerly trodden by the mastodon, and the researches of naturalists have added two more species to the list from *Ava*. One of these is characterised by the comparative width of its molars, as *M. latidens*, and the other, which resembles the grinders of the Elephant, is accordingly named *M. Elephantoides*.

THE TURKEY.

Meleagris gallopavo. L.

The Turkey is almost exclusively a native citizen of federative America, and as an emblem to distinguish our national escutcheon, he might have been selected, as Franklin humourously observed, with much greater propriety than the bald eagle, to whom he is greatly superior in moral and physical character. It is true he is not without his weakness, as being prone to indulge his vanity and self-importance, but his good qualities outweigh all his defects.

The Turkey is familiar to us as the most valuable ornament of the poultry yard, and we are better acquainted with his domestic peculiarities than with the history of his indigenous state. It is to be regretted that our great ornithologist, Wilson, who has left us such beautiful portraits of our feathered tribes, did not live to complete a full delineation of this most interesting of all. Fortunately his loss is in a great measure supplied by Audubon, an American naturalist, endued with the patience and enthusiastic spirit of Wilson, and superior to him, or perhaps to any living artist, in the wonderful powers of his pencil. It is to him we are indebted for a full account of the indigenous Turkey, accompanied by a family portrait of unrivalled truth and splendor.

As an article of luxury for the table, there is no bird which can compare with the Turkey in the delicate flavor of his flesh. In a state of domestication he is easily reared, and attains a size which renders him a very profitable object of husbandry. Unlike the rest of the gallinaceous tribe, however, servitude does not improve his bulk and flavor, in both of which qualities he degenerates from the native bird.

The wild Turkey of the present day ranges through the principal part of the United States. To the South he extends as far as the Isthmus of Darien. To the West his limits appear to be the Rocky Mountains. Like his countryman, the aboriginal red man of America, he has long since been driven from his former residence in the New-England States by the encroachment of civilized settlers, and his boundary in this direction is among the mountainous districts and oak woods of New-Jersey and Pennsylvania. The chief supply of the New-York market is obtained from these regions. He is found in great numbers in the woody parts of Arkansas, Loui-

siana, Tennessee and Alabama; the unsettled parts of Ohio, Kentucky, Indiana, and Illinois, and where the forests extend along the Mississippi and Missouri. He is seldom seen in the Western parts of Virginia and Pennsylvania, and is rare in Florida, Georgia, and Carolina.

In his native haunts his food consists of berries of almost all kinds, fruits, grasses, maize, and insects; tadpoles and lizards are sometimes found in his crop. Acorns are favorite food, and pecan nuts when he can procure them.

The characteristics which distinguish him among barn yard fowls are also to be observed in his indigenous condition; his peculiar and harsh gobble, his curious strutting and puffing attitude, with his tail expanded like the peacock, and his comb and wattles distended, are equally common habits with him in the woods of his native haunts. These strange and uncouth characteristics have gained for him the name of a stupid silly bird, but various traits of intelligence exhibited by him will show that he by no means merits that appellation. It is well known that he notices any new object with great quickness, and is easily excited to anger when any thing of a red color is presented before him. In this temper he will fearlessly rush at the object which offends him, and endeavor to destroy it.

Mr. Audubon relates the stratagems which are practised to protect themselves and young from intruders. Having surprised a hen on her nest, he remarked that by assuming a careless air, whistling or talking to himself as if not noticing her, he was permitted to pass within five or six feet of her, but if he advanced cautiously she would not suffer him to approach within twenty paces of her, but ran off pausing at different distances to observe his movements. They assemble in numerous flocks in certain feeding grounds which they are accustomed to frequent, and to return to, for a succession of years, and even to prefer the same trees as perches. Their roosting places are commonly a point of land jutting into a river covered with large trees. They assemble here at the usual call or gobble for which they are so well known, and perch near each other. In this situation each one seems to consider himself as a centinel or guardian of the flock, giving the note of alarm at the slightest cause. Their quickness of ear is remarkable; even the owl whose flight from his soft plumage is scarcely audible, is often defeated when attempting to surprise them on their

roost. Their manner of eluding the hunter or birds of prey, is by dropping on the grass on the slightest noise, or concealing themselves among shrubs. Hunters thus find it necessary to train dogs for the purpose of taking them, and even these they will sometimes outrun when they have been wounded and unable to use their wings. They are frequently hunted by moonlight while they are perched on trees, and the hunter taking his stand shoots them down without trouble by selecting those which are lowest first. In this manner great numbers will fall one after another, the survivors not seeming to heed the noise of the gun sufficiently to induce them to take to flight. When they migrate they travel in separate bodies, the males together and the females singly with the young, or accompanied by other females in troops of nearly a hundred, seeming careful to avoid the old males who destroy the young ones by striking them on the head. These excursions are performed on foot except wh n they are alarmed or their course obstructed by a river, in which case they make a stand for some time. When preparing to cross it they mount the highest trees, and with the greatest regularity at a signal from a leader the wh le troop wing their flight across. In this manner they will pass a river a mile or more in width, though the weaker ones will sometimes drop by the way. These migrations are usually made in the middle of November, and the mast or beach nuts and other food is devoured in their way; when this becomes scarce, they will approach barns, corncribs, or farmhouses in search of a supply.

Their breeding season commences in March, and the forests then resound with their noisy gobble, in calling to each other; and the observer may then notice the whole troop busily employed. puffing and strutting with their tails spread like fans, and their rustling wings, apparently exerting themselves to draw the attention of their mates.

At this season they are exceedingly pugnacious, and desperate battles ensue among the males. The matrimonial engagement lasts until the female begins to lay, when she shuns her mate, who breaks the eggs when it is in his power, for the purpose, as may be supposed, of preventing a young brood from withdrawing the attentions of the female from himself. The crow is another enemy, who destroys the eggs when he discovers them, and the fox and lynx are equally dreaded by the mother hen. About the middle of April the nest is made.

which is usually composed of a few dried leaves on the ground in a thicket of briar, or by the side of a log. The female lays about ten or fifteen and sometimes twenty eggs of a whitish colour speckled with brown. The mother practices all the stratagems which birds are known to employ to conceal her nest, approaching it with the greatest caution, and varying her course every time by a different route, and when she leaves it to procure her food, she carefully covers the whole with dry leaves, so that it is difficult to discover the exact place where the nest is situated even by one who has watched her movements. When the eggs are near being hatched, the hen will not forsake the nest, and will even suffer herself to be enclosed or imprisoned rather than abandon her charge. Soon after they are hatched the young are led by the mother to elevated dry places, humidity being very injurious to them in their unprotected state: hence, in rainy seasons they are scarce, as the young rarely survive if they have been completely wetted. In about a fortnight the young leave the ground on which they had previously reposed at night under the female, and follow her to some low branch of a tree when they nestle under the wings of the mother. By the month of August they are strong enough to take care of themselves.

Like the wild or Canada goose, the turkey will often cross in a state of domestication, the wild cock and tame hen often producing a cross breed where the wild ones are found. A few years since a gentleman in Westchester county, in this state, procured a young female wild turkey in order to make the experiment of crossing, but owing to some cause it did not succeed, and the ensuing spring the female disappeared. In the following autumn, to his surprise, she returned followed by a large brood; these were quite wild at first, but by a little management they were secured in a coop and the mother allowed her liberty. She remained on the farm until the following spring, when she again disappeared and returned in autumn with another young brood. This course was repeated several years in succession. The eggs of the wild hen are sometimes procured and hatched under the tame hen, and the young thus obtained always retain much of their uncivilized nature.

Besides the N. American Turkey, another species has been discovered frequenting the regions around Honduras. This species is remarkable for the beautiful spots like eyes which ornament his tail—he is hence named *Meleagris occellata.*

SUSPENSION OF VITALITY.

It is a familiar fact, in certain classes of animated nature, that the power of life may be suspended for various periods of time and be again resumed without injury—animals of certain races become torpid during the cold season, at which time they usually retire to places where the temperature is most uniform, and not liable to the extreme severity which at that time prevails on the surface of the earth. The Jerboa, or jumping mouse of Canada, is ploughed up in winter several inches below the ground; bats retire to caves, and snakes and tortoises and other cold-blooded animals to holes and caverns where the frost does not penetrate. The torpidity of such animals ceases on the return of the milder season. In some species of animals this power of suspending some of the vital functions for unlimited periods is very remarkable. The garden snail will become dry in his shell, and apparently lifeless, and so remain for several years, but on being moistened will revive and thrive as vigorously as if his existence had never been interrupted. When we descend to the vegetable kingdom, this power of restoring the vital energy after it has been for a long time dormant, is exemplified in many instances. Nature appears to have provided, in various effective ways, for the perpetuation of these tribes. Seeds, which are the depositories of vegetable life, differ remarkably in their power of retaining this principle. The pimento, pepper, coffee, acorn, and many others, appear to lose this power almost immediately after they are ripe, and will not grow unless planted as soon as they fall from the parent tree. The seeds of plants belonging to warm climates, in general, will not germinate unless stimuleted by artificial heat. Some will remain a long time in the earth in situations unfavorable to their developement, and at length shoot forth when a fit opportunity appears. The settlers in our uncleared lands are familiar with a fact, which can only be accounted for on this principle. When a forest is cut down, the trees which spring up on the spot which has been cleared, are of a species altogether different from that of the preceding growth, the seeds of which must previously have been deposited there and been prevented from germinating by exclusion of heat, moisture, or other exciting causes.

When lakes are drained, a vegetation very often springs up, of plants which are different from any in their vicinity, and which

probably are similar to those which existed when the bottom of the lake was dry like the neighboring soil.

Bulbs which are similar to seeds in their nature, are frequently very tenacious of life, and many of these will recover after being deposited in a dry state for great lengths of time. It is said that a bulbous root was taken from the hand of a mummy which had remained for 2000 years or more, and when it was committed to the ground it revived and vegetated the same as a recent root. This may not appear incredible, when facts within our notice are observed. It is common for the bulbs of the wild or Canada Onion to sprout in the leaves of an herbarium, after having been pressed and dried, and deposited for a long time in that situation. DeCandolle, the celebrated professor of Botany in Geneva, obtained shoots and an entire new plant from a dried bulb of Jonquil which had in like manner been taken from an herbarium, and was equally successful on planting a specimen of Sempervivum which had been dried nearly two years. A similar circumstance is mentioned by Pursh, the author of the American Flora. He found a singular plant never before observed and probably one of the same nature as the Houseleek, or Live-for-ever, in a collection of plants made near Clark's river by the late Gov. Lewis; although it had been dried and pressed, it appeared not to have lost its vitality, and he accordingly planted it in the garden of Mr. McMahon, at Philadelphia. It revived and grew vigorously, and would have come to full maturity had it not met with an accident by which it was destroyed. This plant, so interesting from its rarity, was named by Pursh, *Lewisia*, after its discoverer, but has not since been met with.

OF THE FOOD OF INSECTS.

"In the variety of their instruments of nutrition, insects leave all other animals far behind. In common with them a vast number are furnished with jaws, but of very different constructions, and all admirably adapted for their intended services: some sharp, and armed with spines and branches for tearing flesh; others hooked for seizing, and at the same time hollow for suction; some calculated like shears for knawing leaves; others more resembling grind stones, of a strength and solidity sufficient to reduce the hardest

wood: and this singularity attends the major part of these insects, that they possess in fact two pair of jaws, an upper and under pair, both placed horizontally, not vertically, the former apparently in most cases for the seizure and mastication of their prey; the latter when hooked, for retaining and tearing, while the upper comminute it previously to its being swallowed.

To the remainder of the class of insects, a mighty host, jaws would have been useless. Their refined liquid food requires instruments of a different construction, and with these they are profusely furnished. The innumerable tribes of moths and butterflies eat nothing but the honey secreted in the nectaries of flowers, which are frequently situated at the bottom of a tube of great length. They are accordingly provided with an organ exquisitely fitted for its office—a slender tubular tongue, more or less long, sometimes not shorter than three inches, but spirally convoluted when at rest, like the main spring of a watch, into a convenient compass. This tongue, which they have the power of instantly unrolling, they dart into the bottom of a flower, and, as through a syphon, draw up a supply of the delicious nectar on which they feed. This organ is of a cartilaginous substance, and apparently composed of a series of innumerable rings, which, to be capable of such rapid convolution, must be moved by an equal number of distinct muscles; and though seemingly simple, it is in fact composed of three distinct tubes, the two lateral ones cylindrical and entire, intended, probably, for the reception of air: and the intermediate one, through which alone the honey is conveyed, nearly square, and formed of two separate grooves, projecting from the lateral tubes; which grooves, by means of a most curious apparatus of hooks like those of the laminae in a feather, inosculate into each other, and can be either united into an air-tight canal, or be instantly separated, at the pleasure of the insects.

Another numerous race, the whole order Hemiptera, abstract the juices of plants or of animals by means of an instrument of a construction altogether different—a hollow grooved beak, often jointed, and containing three bristle formed lancets, which, at the same time that they pierce the food, apply to each other so accurately as to form one air-tight tube, through which the little animals seek up their repast; thus forming a pump, which, more effective than ours, digs the well from which it draws the fluid.

A third description of insects, comprising the whole tribe of flies, have a sucker formed on the same general plan as the last described, but of a much more complicated and varied structure. It is in like manner composed of a grooved case and several included lancets; but the case, although horny, rigid and beak-like in some, is in others fleshy, flexible, and more resembling the proboscis of an elephant, and terminates in two turgid liplets: and the accompanying lancets are themselves included in an upper hollow case, in connexion with which they probably compose an air tight tube for suction. The number and form of their instruments is extremely various. In some genera there is but one, which resembles a sharp lancet. Others have three, the two lateral ones needle shaped, that in the middle like a scymetar; together forming an extremely keen apparatus. In many, we find two precisely resembling lancets, and two, even to the very handle, a buck-hafted carving knife The blood thirsty gnat has five, some acutely lanced at the extremity, and others serrated on one side. The flea, the spider, the scorpion, have all instruments for taking their food of a construction altogether different. But it is impossible to give even a sketch of the variations in these organs which take place in the apterous genera, and in many of the dipterous larvae. Suffice it to say that they all manifest the most consummate skill in their adaptation to the purposes of the insects which are provided with them, and which can often employ them not only as instruments for preparing food, but as weapons of offence and defence, as tools in the building of their nests, and even as feet.

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Some insects have the faculty of sustaining a long abstinence from all kinds of food. This seems to depend upon the nature of their habits. If the insect feeds on a substance of a deficiency of which there is not much probability, as our vegetables, &c. it commonly requires a frequent supply. If, on the contrary, it is an insect of prey, and exposed to the danger of living long deprived of its food, it is often endowed with a power of fasting which would be incredible but for the numerous facts by which it is authenticated. The ant-lion will exist without the smallest supply of wood, apparently uninjured, for six months; though when it can get it, it will devour

daily an insect of its own size. Vailliant assures us that he kept a spider without food under a sealed glass for ten months, at the end of which time, though shrunk in size, it was as vigorous as ever. Mr. Baker states that he kept a beetle alive for three years without food of any kind."—*Kirbey's Entomology.*

AN ACCOUNT OF A BATTLE OF ANTS.

By M. Hanhart.

The combatants were two species of ants, one the *Formica rufa*, the other a little black ant. They approached each other in armies composed of their respective swarms, and in the most perfect order. The *Formica rufa* marched with one front on a line from nine to twelve feet in length, flanked by several corps in square masses composed of from twenty to sixty individuals. The other species (the little blacks,) forming an army much more numerous, marched to meet the enemy on a very extended line, and from one to three individuals abreast. They left a detachment at the foot of their hillock to defend it against any unlooked-for attack. The rest of the army marched to battle, with its right wing supported by a solid corps of several hundred individuals, and the left wing supported by a similar body of more than a thousand. These groups advanced in the greatest order, and without changing their positions. The two lateral corps took no part in the principal action. That of the right wing made a halt and formed an army of reserve; while the corps which marched in column on the left wing manœuvered so as to turn the hostile army, and advanced with a hurried march to the hillock of the *Formica rufa*.

The two armies attacked each other and fought for a long time without breaking their lines. At length disorder appeared in various points, and the combat was maintained in detached groups; and after a bloody battle, which continued from three to four hours, the *Formica rufa* were put to flight, and forced to abandon their two hillocks and go off to establish themselves at some other point with the remains of their army.

The most interesting part of this exhibition, says Mr. Hanhart, was to see these insects reciprocally making prisoners, and transporting their own wounded to their hillocks. Their devotedness

to the wounded, was carried so far, that the *Formica rufa*, in conveying them to their nests, allowed themselves to be killed by the blacks, without any resistance, rather than abandon their precious charge.

From observations of M. Huber, it is known that when an ant hillock is taken by the enemy, the vanquished are reduced to slavery, and employed in the interior labors of their habitation.—*Ed. Phi. Jour.*

Domestic and Rural Economy.

MANAGEMENT OF THE TEETH.

The management of the teeth, is a subject of no little importance in the preservation of health. Those organs are destined to perform an important office in the system, and upon their healthful state, depends several highly interesting particulars. An offensive breath, which often arises from a disordered state of the digestive system, is occasioned also by the neglect of the teeth; they become covered with tartar, which is a deposite, or sediment of the saliva, and the particles of food, which remain in the interstices, are decomposed and give the breath a disagreeable fœtor. The remedy for this, so far as the mouth is concerned, is a proper attention to the teeth. They should be carefully and frequently rubbed with a brush, moderately hard: pure water is the only kind of dentifrice, which is required in this operation, or which can be of any real aid.

It is evident that the friction of a brush acts as a wholesome exercise, hardens the gums, and thus enables them to withstand the different extremes of heat and cold, to which they are exposed; the brush also performs another important service, that of removing the extraneous substances which insinuate themselves into the interstices of the teeth, and lodge there. This habit of regularly and frequently administering this exercise, is also highly efficacious in preventing that most excruciating pain, the tooth ache.

The supposition that certain compounds, which are prepared as dentifrices, have the effect of correcting the breath, is entirely fallacious and pretended; any substance of an odoriferous nature, will communicate its own scent to the breath, soon after it is introduced into the mouth, but its effect soon ceases. It is decomposed very rapidly by the saliva, and then, if any thing, increases rather than diminishes the fœtor by adding a substance which soon becomes rank and offensive itself.

If, however, a dentifrice is preferred to pure water alone, we can recommend nothing better, nor perhaps so good, as Ivory Black, which is known to be an animal charcoal, and is preferable to the

vegetable, since it can be reduced more easily, to an impalpable powder, and is thus entirely free from the grit, which is apt to be present, in most kinds of tooth powders: it is moreover perfectly pure and harmless in its nature, and is not unpleasant to the taste.

EGGS.

A correspondent desires to know what is the most effectual and cheapest method of preserving eggs for a considerable length of time. On this subject our experience is not very conclusive, but we can suggest the best modes in common use, and at the same time solicit those who have given their attention to it, to give us the result of their experiments.

It seems to be admitted generally that the proper mode of proceeding is as much as possible to exclude them from the air, and therefore a coating of any substance, such as sugar, gum, or others which will stop the pores of the shell, will effect the purpose. The common practice in England is to anoint them with mutton suet, and to set them on end in layers, covered by bran. They are sometimes packed in fine salt, charcoal, &c.:—we would suggest the idea of packing them in air-tight vessels or jars, the covers of which should be fitted with valves so that the air might be extracted and kept from them.

Experiments of different modes, however, often fail, not so much because they are badly performed, as because the eggs themselves have not been taken in hand in time: they ought in all cases to be taken soon after they are laid, since the longer they remain the more the chance of preserving them is diminished, and their vitality is lost.

POTATO CHEESE.

In Thuringia and part of Saxony, a kind of potato cheese is made, which is very much sought after. The following is the recipe: select good white potatos, boil them, and when cold, peal and reduce them to a pulp, with a rasp or mortar; to five pounds of this pulp, which must be very uniform and homogenous, add a pint of sour

milk, and the requisite portion of salt; knead the whole well, cover it, and let it remain three or four days, according to the season;—then knead it afresh and place the cheese in small baskets, when they will part with the superfluous moisture;—dry them in the shade, and place them in layers in large pots or kegs, where they may remain a fortnight. The older they are the purer they become.

This cheese has the advantage of never engendering worms, and of being preserved for many years, provided it is kept in a dry place and in well closed vessels.

CHLORIDE OF LIME.

Nothing tends more to create sickness than filth: the offensive fœtor, and unwholesome miasmata arising from vaults, sinks, and mudholes in which swine are allowed to wallow, we have no doubt, are often the cause of those diseases among children in the summer, which are generally attributed to eating of fruit or something else. Unless, therefore, we mean to endanger the health of our families, these places should be frequently cleansed and purified, particularly during the warm weather. One pound of the *chloride of lime*, which may be purchased at any druggists for twelve and a half cents, mixed with a pail of water and thrown into any receptacle of filth, will immediately destroy its unwholesomeness and offensive smell. It is always easier, as well as cheaper, to *prevent* disease, than it is to cure it, and he who neglects to do so when the trouble and expense is so trifling, is guilty of wilfully and unnecessarily exposing the health of his family.

METHOD OF MAKING A CEMENT TO COVER BUILDINGS, AND FOR OTHER PURPOSES.

Take one part of pulverized marble, one part of pulverized flint, or any silex, and one part of chalk, to which add one part of lime that has been sometime slacked, and mix the whole with water to the consistence of a thin paste; spread this very thinly over a rough ground, and make it smooth with a trowel. The ground on which this cement is to be put should be prepared in the following way: Mix equal parts of

coarse river sand and that which is pulverized from mill-stones, and lime which has been slacked sometime before; make a paste of these by adding as much water as is necessary; when about to use it, add a fifth part of fine sifted lime—apply this as common plaster.

ECONOMICAL WATER COLOUR FOR ROOMS.

Take a quantity of potatos and boil them—then bruise and pour boiling water upon them until a pretty thick mixture is obtained, which is to be passed through a sieve. With boiling water then make a thick mixture of whitening and put it to the potato mixture. To give color, if white is not wanted, add different colored ochres, lampblack, &c. according to circumstances. This paint dries quickly, is very durable, has a good appearance to the eye, and is moreover very cheap.—*London Paper.*

METHOD OF CLARIFYING VINEGAR.

Vinegar may be cleansed of the fecula, or thick matter which it generally holds in suspension, and which gives it a turgid, disagreeable appearance, by the following cheap and simple method. Take a gallon or two, and place it in a kettle over the fire; when near a boiling heat, a few spoonsful of Ivory Black are to be added and intimately mixed with the vinegar; then take it from the fire and let it stand until the Ivory Black subsides to the bottom, when the vinegar will remain as pure and limpid as water, without any diminution of its acidity.

METHOD OF SEPARATING GLASS TUMBLERS.

Tumblers sometimes get forced into each other so tight that it is difficult to separate without breaking them; when this is the case, place the outside one in warm, and fill the other with cold water: the expansion of one, and the contraction of the other, will loosen them so that they can be easily separated.

TO MAKE SWEET BREAD FROM DOUGH THAT HAS BECOME SOUR BY STANDING TOO LONG.

Take the common carbonate of magnesia of the shops, and after pulverizing it, knead it with the dough, in proportion of about half an ounce to four or five loaves. The bread will come out of the oven perfectly sweet and wholesome.

Miscellany.

TIMBUCTOO AND MAJOR LAING.

From Caillies' Travels to Timbuctoo, in the year 1828.

"At length, we arrived at Timbuctoo, just as the sun was touching the horison.* I now saw this capital of the Soudan, to reach which had so long been the object of my wishes. On entering this mysterious city, which is an object of curiosity and research to the civilized nations of Europe, I experienced an indescribable satisfaction. I never before felt a similar emotion, and my transport was extreme; I was obliged however to restrain my feelings, and to God alone did I confide my joy. With what gratitude did I return thanks to Heaven, for the happy result which attended my enterprise! How many grateful thanksgivings did I pour forth for the protection which God had vouchsafed to me, amidst obstacles and dangers which appeared insurmountable. This duty being ended, I looked around and found that the sight before me, did not answer my expectations. I had formed a totally different idea of the grandeur and wealth of Timbuctoo. The city presented, at first view, nothing but a mass of ill-looking houses, built of earth. Nothing was to be seen in all directions but immense plains of quicksand of a yellowish white color. The sky was a pale red as far as the horison: all nature wore a dreary aspect, and the most profound silence prevailed; not even the warbling of a bird was to be heard. Still, though I cannot account for the impression, there was something imposing in the aspect of a great city, raised in the midst of sands, and the difficulties surmounted by its founders cannot fail to excite admiration. I am inclined to think that formerly the river flowed close to Timbuctoo; though at present it is eight miles to the north of that city, and five miles from Cabra, in the same direction.

*30th of April, 1828. It may be proper to remark, that M. Caillies is the first and only Christian, or European, who has ever visited this city, and returned.

I took up my abode with Sidi Abdallahi, who received me in a friendly manner. He had already been indirectly acquainted with the alledged circumstances, which, as I pretended, had occasioned my journey across the Soudan. He invited me to sup with him; and an excellent couscous of millet and mutton was served up. Six of us partook of the dish, and we ate with our fingers; but in as cleanly a way as was possible under such circumstances. Sidi Abdallahi, according to the custom of his countrymen, did not say a word to me. He was a mild, quiet, reserved man. His age might be about forty or forty-five. He was five feet high, stout and pitted with the small pox. His countenance was pleasing, his manners grave, and rather dignified. He had no fault but his religious fanaticism. After bidding my host good night, I went to repose upon a mat which was spread upon the ground in my new lodging. At Timbuctoo, the nights are as hot as the days, and I could get no rest in the chamber which had been prepared for me. I removed to the court adjoining the house, but still found it impossible to sleep. The heat was oppressive; not a breath of air freshened the atmosphere. In the whole course of my travels I never found myself more uncomfortable. On the morning of the 21st of April, I went to pay my respects to my host, who received me with affability; afterwards I took a turn round the city. I found it neither so large nor so populous as I had expected. Its commerce is not so considerable as fame has reported. There was not as at Jenne a concourse of strangers from all parts of the Soudan. I saw in the streets of Timbuctoo only the camels, which had arrived from Cabraladen with the merchandise of the flotillas, a few groups of the inhabitants sitting on mats, conversing together, and Moors lying asleep in the shade before their doors. In a word, every thing had a dull appearance. At Timbuctoo, it is very unusual to see any other merchandise except what is brought by the vessels and a few articles from Europe, such as glass wares, amber, coral, sulphur, paper, &c. I saw three shops kept in small rooms, well stored with stuffs of European manufacture. The Merchants put out at their doors cakes of salt for sale, but they never exhibit them in the market. Such as do business at the market have stalls made of stakes covered with mats, to protect them against the heat of the sun. Often, when seated before my door, I thought of the

fate of that unfortunate traveller, who, after surmounting numberless dangers and privations, was cruelly assassinated when on the eve of returning to his country.* In the course of these reflections I could not repress a feeling of apprehension, lest, should I be discovered, I might be doomed to a fate more horrible than death—to slavery! But I determined to act with caution, and not afford any ground for suspicion. * * * * *

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The city of Timbuctoo is principally inhabited by negroes of the Kissoor nation. Many Moors also reside there. They are engaged in trade, and, like Europeans, who repair to the colonies in the hope of making their fortunes, they usually return to their own country to enjoy the fruits of their industry. They have considerable influence over the native inhabitants of Timbuctoo, whose king or governor is a negro. This prince who is named Osman, is much respected by his subjects. He is very simple in his manners; his dress is like that of the Moors of Morocco; and his house is no better furnished than those of the Moorish merchants; he is himself a merchant, and his sons trade with the Jenné. He inherited a considerable fortune from his ancestors, and is very rich. He has four wives, besides an infinite number of slaves, and is a zealous Mahometan. The sovereignty is hereditary, descending to the eldest son. The king does not levy any tribute on his subjects or on foreign merchants, but he receives presents. There is no regular government. The king is like a father ruling his children. He is mild and just, and has nothing to fear from his subjects. The whole community, indeed, exhibits the amiable and simple manners of the patriarchs. In case of war, all are ready to serve; but the mild and inoffensive manners of these people afford little ground for quarrels, and when they arise, the natives of Timbuctoo repair to their king, who assembles a council of the elders, all of whom are blacks. Though the Moors are not permitted to take part in these councils, yet my host, Sidi Abdallahi, the friend of Osman, was sometimes allowed to be present at them. * * * *

The city of Timbuctoo, forms a sort of triangle, measur-

*Major Laing.

ing about three miles in circuit. The houses are large, but not high, consisting entirely of a ground floor. In some, a sort of little closet is constructed above the entrance. They are built of bricks of a round form, rolled in the hands, and baked in the sun. The walls, except as far as regards their height, resemble those of Jenné. This mysterious city, which has been an object of curiosity for so many ages, and of whose population, civilization, and trade with the Soudan, such exaggerated notions have prevailed, is situated in an immense plain of white sand, having no vegetation but stunted trees and shrubs, such as the *Mimosa ferruginea* which grows no higher than three or four feet. The city is not closed by any barrier, and may be entered on any side. Within the town are seen some of the *Balanitis ægyptiaca*, and in the centre is a palm tree. Timbuctoo may contain at most about ten or twelve thousand inhabitants; all are engaged in trade. The population is at times augmented by the Arabs, who come with the caravans, and remain awhile in the city. In the plain several species of grass and thistles afford food for the camels. Fire wood is very scarce, being all brought from the neighborhood of Cabra. It is an article of trade, and the women sell it in the market place. It is only burnt by the rich; the poor use camels' dung for fuel. Water is also sold in the market place; the women give a measure containing about half a pint for a cowrie. All the native inhabitants of Timbuctoo are zealous Mahometans; their dress is similar to that of the Moors. Like the Arabs, they are allowed to have four wives each. The women attend to domestic occupations, and they are not, like the Mandingo females, subject to the punishment of beating. The people of Timbuctoo, who are in constant communication with the half-civilized inhabitants of the Mediterranean, have some idea of the dignity of human nature. I have constantly observed in my travels, that in proportion as a people was uncivilized, the women were always more enslaved. The female sex in Africa have reason to pray for the progress of cultivation. The women of Timbuctoo are not veiled like those of Morocco; they are allowed to go out when they please, and are at liberty to see any one. The people are gentle and complaisant to strangers. In trade they are industrious and intelligent; and the traders are generally wealthy and have many slaves. The men are of the ordinary size, well

made, upright, and walk with a firm step. Their color is a fine deep black. Their noses are a little more aquiline than those of the Mandingoes, and like them they have their lips and large eyes. I saw some women who might be considered pretty. The inhabitants of Timbuctoo are exceedingly neat in their dress, and in the interior of their dwellings. Their domestic articles consist of calabashes and wooden platters. They are unacquainted with the use of knives and forks, and they believe, that, like them, all people in the world eat with their fingers.

The Tooariks have, like all Mahometans, several wives. The largest and the fattest are the most admired. To be a real beauty, with them, a woman must have such a degree of obesity as will render her unable to walk without two assistants. They have all fine horses, which they manage ably. They are as cruel as they are warlike. Their weapons consist of three or four pikes, and a poinard, which they wear on the left arm; the blade pointing upward, and the hilt touching the back of the hand. To the sheath of these poinards, is attached a kind of muff, through which the hand is pressed; they are straight, and very well made. This weapon is brought from the banks of the Mediterranean. These men, also, carry bucklers of tanned ox hide, the workmanship of which is elegant. In their form they resemble the shields of the ancient knights, except that they are square at the extremities.* They are adorned with handsome designs, and are large enough to cover the whole body.

I employed the remainder of the time that I staid in Timbuctoo in obtaining information respecting the unfortunate death of Major Laing, which I had heard mentioned at Jenné, and which was confirmed by the inhabitants of Timbuctoo, whom I questioned respecting the melancholy event. I learned, that when within a few days' journey of the city, the caravan to which the Major belonged, was stopped on the road to Tripoli, by the Tooariks, or as others alledge by the Berbiches, a wandering tribe, near the Dhioliba. Laing, being discovered to be a christian, was cruelly attacked, and his associates continued beating him with a club until they thought him dead. I conclude that the other christian, who

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* Like the shields of the ancient Egyptians.

was said to have been actually murdered, was a servant of the Major's. The Moors belonging to the caravan raised Laing up, and succeeded in restoring him to animation. When he became sensible they placed him upon a camel, but he was so weak that they were obliged to tie him on. The robbers left him almost destitute, having robbed him of the greater part of his merchandise. On his arrival at Timbuctoo, Major Laing healed his wounds by the aid of an ointment, which he brought with him from England. His recovery was slow; but he was made very comfortable, owing to the letters of recommendation which he had brought from Tripoli, and especially to the attention of his landlord, a Tripolitan, to whom he had been directed. The house of this Moor was near that in which I lodged at Timbuctoo. I had frequent opportunities of seeing him. He appeared to me a man full of friendly feeling. Many a time he has given me dates, from mere charity, and the day before I left he made me a present of a pair of blue cotton trowsers, to wear on my journey. He told me that the Major had been recommended by a Tripolitan house, to an old man, who, not having convenience to lodge him, transferred him to his hospitality. Laing, he added, never laid aside his European dress, and used to give out, that he had been sent by his master, the King of England, for the purpose of making himself acquainted with Timbuctoo and the wonders it contains.* It would appear that the traveller had openly taken a plan of Timbuctoo, for the same Moor told me in his simple way, that *he had written down every thing in it.*

Major Laing ardently wished, instead of proceeding to Europe by the desert, to travel by Jenné and Sego, ascending the Dhioliba, whence he might have reached the French factories on the Senegal. But no sooner had he communicated his plan to the Foulahs established on the borders of the Dhioliba, (a great number of whom had resorted to Timbuctoo, on hearing of the arrival of a christian,) than they all declared they would never suffer a Nassasah to set foot in their territory, and if he made the attempt, they warned him that he would have cause to repent it. The Major, perceiving that he could do nothing with these fanatics, chose the route

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* It is doubtful whether the English traveller would express himself in this manner.

to el-Arawan, where he hoped to join a caravan of Moorish merchants, conveying salt to Sansanding; but alas! after journeying five days to the north of Timbuctoo, the caravan with which he had come up was stopped by Sheikh Hamet-oul'd-Habib, an old fanatic, chief of the tribe of Zawaat, who wander in the desert of that name. Sheikh Hamet seized the Major, under pretence of his having entered his territory without permission. He then wished to compel him to acknowledge Mahomet to be the prophet of God, and required him even to make the salam.

Laing relying too confidently on the protection of the Pacha of Tripoli, who had recommended him to all the Sheikhs of the desert, refused to obey Hamet, who more and more urgently insisted on his acknowledging himself a Mussulman. Laing continued firm, and chose to die rather than yield; a resolution which made one of the most intelligent of travellers a martyr to the cause of science. A Moor, belonging to the train of the chief, of the Zawaats, who was directed by his master to kill the christain, refused to execute his order. "What," said he, "do you wish me to slay the first Christain who has come among us, and one who has done us no injury? give the commission to another; I will not be the instrument of his death; kill him yourself." This address suspended for a moment the fatal sentence, and the question of Laing's life or death was warmly debated for some time; at length the latter was decided on. Some black slaves were summoned, and they were ordered to perform the horrid deed, with which the Moor had refused to stain his hands. One of the murderers tied his turban round the neck of the victim, and strangled him on the spot, he pulling one end while his comrade held the other. The corpse of the unfortunate Laing was cast upon the desert, to become the prey of the raven and the vulture, the only birds which inhabit these desolate regions."

LABOR SAVING MACHINERY.

It has been suggested in some respectable publications, that labor saving machinery, by being extended too far, and diminishing employment, is a curse, instead of a blessing, to the world. Opinions of this kind, we think, result from the want of reflection, and too limited a survey of the matter in question.

The objects which these improvements are calculated to facilitate, are, in the main, to promote the production and distribution of food and clothing for the human race; in fact to make them more abundant, and to bring them to the consumers with less trouble and less expense. Can this injure the world at large? If a coat by any contrivance could be made with half the labor, and of course with half the expense it has heretofore cost, is it not as beneficial as an improvement in agriculture, whereby with manure or any other application, two bushels of grain could be raised on ground which before would produce only one? But it is said that people are thrown out of employment. It is true that improvements in any department of industry which dispenses with human labor, may temporarily throw out of employment a portion of those engaged in it—unless the reduced price at which they are enabled to produce by means of the improvement, increases consumption and promotes sales, so that the aggregate proceeds to the laborers employed are increased. But we should like to learn what great improvement has eventually diminished the demand *for*, or the compensation to labor. One of the greatest labor saving improvements of modern times, may be found in Arkwright's machine for spinning cotton yarn, first used in England. It was, at the outset, viewed by the spinners of cotton in the old way, as a curse. Mobs collected and broke the machinery in pieces; but when it was fairly introduced, cotton yarns were spun with such facility, and so cheap, and the demand was so much greater than before, that in fact a greater number of cotton spinners found more support than ever. New markets were opened for quantities that these machine breakers had no conception of. The statistical writers who were the cotemporaries of Arkwright, calculated that the population of Great Britain had arrived to its maximum;—that the productions of the kingdom could not be made to support any addition to their population. But by means of this improvement in spinning, and a further improvement in weaving, they have increased the manufacture of cotton from a sum comparatively inconsiderable, to $300,000,000 per annum. This enormous sum is chiefly made out of the labor of British subjects. The population in the mean time has doubled, and the comforts of life are more abundant and more generally diffused than they were before the time of Arkwright. Suppose every cotton factory in that kingdom annihilated, from what source could such an amount be obtained by any conceivable employment in which their workmen could engage?

We would ask the opponents of labor saving machinery where they would stop? The plough and the harrow are labor saving machines. Would they use the spade and the rake? These again are labor saving machines. The ship with sails supersedes the ancient use of oars, and vast numbers of rowers have at some period been thrown out of employment. The steamboats have occasioned the same inconvenience to great numbers of stage drivers, &c. on the shores of our navigable rivers, and public houses on the roads have been rendered of diminished value; but such partial evils have been compensated an hundred fold by reduced transportation, and ready communication. The comforts of life have also been greatly multiplied, and more generally distributed. All attempts, therefore, to arrest the progress of improvement must be considered as blows aimed at the comfort and happiness of man, and better suited to the doctrines of the dark ages, than to the age in which we live. The manifold benefits we are daily enjoying from the improvements made in the mechanical arts, should inspire us with gratitude, that Providence has, by their means, enabled us so greatly to mitigate the primeval curse, and stimulate us to go on, adding improvement to improvement.

But we are not disposed to enter into a labored argument to prove the position we have taken; those who will take the trouble to look at the present state of society, need no other proof to convince them than the evidence of their own senses; if they will not believe this, nothing we could say would alter their opinions: we must deal with such people as we would with that class of philosophers, called immaterialists, who doubted and doubted, until they doubted whether there was any substance in matter, and whether they really existed;—leave them to doubt in the midst of demonstration.

THE VALUE OF MONEY IN DIFFERENT COUNTRIES OF EUROPE, ESTIMATED IN DOLLARS AND CENTS.

As the comparative value of money in different countries is subject to slight and irregular changes, it cannot be precisely fixed for any given time. The following tables are believed to approach as near to it, as the nature of the subject will admit. The Aster-

isks denote, that the denomination to which they are annexed is only nominal, and not represented by any real coin. The fractional parts of the cents are decimals.

Great Britain.	$ cts.
Farthing	00,46
Penny	01,85
Groat	07,40
Shilling	22,22
Crown, or 5 shillings	1 11,16
Sovereign, or pound	4 44,44
Guinea, 21 shillings	4 66,66
France.	
Denier	00,08
Sol, or 12 deniers	00,92
Livre Tournois, or 20 sols	18,52
Ecu, or crown, 6 livers	1 10,00
Pistole,* 10 livers	1 85,17
Louis d'or	4 44,44
Franc	18,74
Five francs	93,70
Spain.	
Maravedie*	00,30
Rial	10
Pistarine	20
Piaster of ex*	80
Dollar	1 00
Ducat of ex*	1 10,18
Pistole	3 60
Holland.	
Stiver	01,94
Scalin	11,64
Guilder, or Florin	38,80
Rix dollar	97
Ducat	2 07,86
Gold Ducat	8 00
Portugal.	
Re	00,12
Vintin	02,50
Testoon	12,50
Crusade of ex	50,00
Milre*	1 25
Moidore	6 00
Joanese	8 00
Italy.	
Soldi	00,80
Chevelet	03,18
Lire*	15,92
Testoon	23,88
Croisade	79,60
Pezzo of ex*	92,60
Genouine	1 36,12
Pistole	3 20
Switzerland.	
Fenning	00,24
Cruitzer	00,92
Sol*	02,77
Gulden	55,55
Rix dollar	1 00
Austria.	
Cruitzer	00,86
Grosh	03,14
Batzen	03,44
Gould	51,85
Rix dollar	77,77
Ducat	2 07,40
Sweden.	
Stiver	00,72
Copper marc	02,88
Silver marc	08,64
Copper dollar	11,52

	$ cts.
Caroline	25,92
Rix dollar	1 03,70
Ducat	2 07,40
Denmark.	
Skilling	01,04
Duggen	06,24
Marc*	16,66
Rix marc	20,83
Rix ort	25,
Crown	66,66
Rix dollar	1 00,
Ducat	8 83,34
Prussia.	
Grosh	00,86
Coustic	04,32
Tinse	12,96
Ort	15,55
Florin	25,92
Rix dollar*	77,76
Ducat	2 07,40
Frederic d'or	3 88,80
Russia.	
Altin	03,
Grievener	10,
Polpotin	25,
Poltin	50,
Ruble	1 00,
Zervonitz	2 00,
Turkey.	
Mangar	00,28
Asper*	01,12
Parac	03,33
Bestic	05,55
Estic	11,11
Solata	22,22
Piaster*	88,80
Caragrouch	1 11,10
Xeriff	2 22,20

American Almanac.

SUSPENSION RAILWAY.

At a season when the public mind seems to be directed exclusively to the useful arts, a short description of the Suspension Railway, models of which have been recently introduced into this country, may not be unacceptable to our readers. It is taken chiefly from a pamphlet by Maxwell Dick, of Irvine, in Scotland, and from an inspection of the working models, late at Tammany Hall, which the pamphlet is intended to illustrate. It may be necessary to premise that this subject naturally presents itself under two separate and distinct points of view, namely: the principle of the rail road itself and the moving power. We shall first notice the principle of the rail road. Imagine then two parallel bars of round wrought iron of $\frac{7}{8}$ of an inch, suspended horizontally in the air at the height of 14 or 15 feet from the ground. These are supported on stone pillars about one hundred and fifty feet apart, and every 15 feet between these stone abutments the rods are supported by cast iron pil-

lars. To give additional strength to these rods, two others of the same size are placed one under each rod. and connected to the upper rods by braces. The car, furnished with broad grooved wheels, now fits snugly on the upper iron bar, and a slight effort will set it in motion. To prevent the car from jumping out of its place, two or more safety wheels are placed against its sides underneath the lowermost horizontal rail. These, as long as the car runs smoothly, never touch the bar; but the moment the car is made to rise from the upper rail these lower smooth wheels strike against the under side of the lower bar and bring the car down again upon the rail. By varying the length of the supporting posts, slight inequalities of surface may be overcome, and a great saving be made in marshy spots, or where the loose nature of the soil would require profound excavations for ordinary canals and rail roads. It will be perceived that by this plan, the ordinary preliminary expenses necessary for canals and rail roads are much reduced, for the ground over which it passes may still be employed for all agricultural purposes. From the pamphlet already alluded to, we learn that the expense of fitting up one mile of this suspension railway with a single line of rails, estimating the ground at $4,50 per acre, would be in England about $6,000; for a double line about $9,000. It is supposed by many competent iron masters that the expenses in this country would not vary materially from this sum. What a contrast does not this present with the ordinary ground rail roads, the average expense of which is about $20,000, and several miles of the great rail road near Baltimore, have cost more than five times this sum. It is estimated that the Chesapeake and Ohio Canal will cost $22,914 per mile, but its progress hitherto has shown this estimate to be too low. The distance is 338 miles, and will cost 8 millions of dollars, while a suspension railway would, for the same distance, cost only 3 millions of dollars. The canal connecting the Delaware and Chesapeake bays, a distance of 13½ miles, cost more than 2 millions; a suspension railway for this distance would have cost about $120,000. The various canals in the State of New-York, amounting to about 450 miles, have cost over 10 millions; the suspension railway would have reduced this to nearly 4 millions of dollars; but it is useles to multiply examples of the comparative cost, for it possesses other great and preponderating advantages. Besides occupying so little of the

surface, it can never be blocked up and rendered impassable by snow, and no obstacles can remain on its surface, so that at all seasons, it can be traversed with perfect security. No embankments, excavations, bridges or tunnels, will be required, and if the propelling power proposed by Mr. Dick should be adopted, the great weight and strain of the heavy locomotive engine will be avoided. This naturally brings us to the consideration of the moving power which is suggested, and has indeed been tried on a small scale by Mr. Dick. The whole distance is divided into stations five miles apart; at each station is a piece of machinery consisting of a drum and multiplying wheels; to the front of the car is attached a drag rope, which, supported on rollers beneath, goes to the next station, passes over a wheel and then returns to the drum. Passing over this drum it is attached to the hinder part of the car, and thus forms an endless line, regulating the velocity of the car or stopping it entirely. In the model the machinery is set in motion by a crank turned by hand, but it will readily be conceived that any power may be employed. It appears to us that the weight of the chain or rope itself, twice five miles in extent, sufficiently strong to drag one or more loaded cars, must require a very great power to set and keep it in motion; this is however a problem to be solved by actual experiment. Mr. Dick made an experiment on a small scale and found that to raise at the distance of two miles a weight of 4 lbs. by a line weighing itself six pounds, it was necessary to employ a force equal to eight pounds, or 2 lbs. less than the real weight dragged. With regard to speed, there seems by the use of this machinery, to be no limits to the velocity which may be obtained. In the working models, which are about 40 feet long, one perfectly level, and the other ascending and descending, the velocity of the cars appeared to be indeed *fearful*. Mr. Dick's experiments upon a railway of rope two miles in length, gave him the rate of 30 miles an hour, and he demonstrates that the mail may be carried at the rate of 60 miles, but as this would be perhaps attended with danger to individuals, he proposes to transmit it from one post-office to another, without any guard, as he would consider its velocity a sufficient protection.

EXPLOSION OF THE BOILERS OF STEAM ENGINES.

We are gratified to observe, by the last number of the Journal of the Franklin Institute of Philadelphia, that with a highly honorable and praiseworthy zeal for improvement in the mechanic arts, and the conveniences of the community which has long characterized that excellent society, they have had under consideration the subject of the explosion of the Boilers of Steam Engines, and have appointed a committee to collect such information relative to the subject as may lead to a developement of the cause of the explosions which have of late so frequently occurred. With the view of lending our feeble aid to so laudable an object, we cheerfully give place to the following circular letter of the committee. Should any of our readers feel competent to answer any of the queries of the committee, we hope they will not neglect to do so.

"The Franklin Institute of the State of Pennsylvania, for the promotion of the Mechanic Arts," have had their attention lately called to the subject of the explosion of steam boilers, by the lamentable number of accidents that have occurred in steam boats during the present season; and by the painful circumstances which have in many cases attended these accidents. They have long had the subject before them, and are impressed with the hope, that those explosions were produced rather by imperfection in the construction, arrangement, or management of the machinery, than by any inherent and irremediable source of danger in the invention itself. Feeling a high interest in the promotion of the success of the mechanic arts, and especially of that of steam navigation, which with pride they consider as peculiarly the offspring of American ingenuity and perseverance, they have appointed the undersigned a committee for the purpose of inquiring,

1st. What are the probable causes of the explosions of boilers on board of steam boats?

2nd. If any, what are the best means to obviate the recurrence of these evils, or to diminish the extent of their injurious influence, if they cannot be wholly guarded against?

3d. By what means can those remedies be applied and enforced?

We are aware, that no investigation of so difficult and extensive a subject, can be productive of good, unless it occasion a concen-

tration upon one point, of all the information that results from the use of steam boats over so vast a country as ours, during a period of upwards of twenty years. With this view, we beg leave to call your attention specially to it, and to request that you may be pleased to communicate to us the result of your observation, experience or reflection, on these interesting questions. We shall feel thankful to you, particularly for an account of any explosion which may have occurred in your vicinity, or under your observation, or of which you may have obtained correct information. By collecting the *facts* in a number of cases, we may be able to arrive at some satisfactory conclusions, as to the causes which produced them; we are aware, that these may have been different in different cases, and although we are by no means prepared to assume it as certain, that a simple and efficacious remedy will be devised, yet we hope that such a one may be found, and one which will not unduly interfere with the rights of individuals, or with the freedom of commerce and industry.

We had at first proposed to draw up a series of questions for publication and circulation, but upon mature deliberation prefer to leave the subject open, assuring you, that any information or suggestion will be thankfully received, and duly acknowledged in the report that we shall make of the result of our investigation. We beg leave, however, to suggest a few general heads, which may direct your attention to those points upon which we are chiefly anxious to obtain information, viz.

The Boiler.—Its size, form and relative thickness, the material from which it is made, (of copper or iron, &c.) if of iron, whether of foreign or American iron, especially in the boilers that exploded.

Safety Valve.—Its form, size, load in proportion to the thickness of the boiler, liability to get out of order, facility of repair, number used, location.

Supply of Water.—Mode of insuring a sufficiency, how gauged?

Arrangement of the Boilers in the Boat; which is the least liable to accident?

Construction of the Boat.—To avoid the accidents in the boilers.

In addition to these, we will add, that our wish is that the investigation should take the widest range, and we beg that you will give the same scope to your answer.

Please direct your reply to Mr. William Hamilton, Actuary of the Franklin Institute.

W. H. Keating,
Robert Hare, M. D.
Samuel C Merrick,
Alexander Dallas Bache,
Isaiah Lukens,
James J. Rush,
James Ronaldson,
Frederick Graff,
R. M. Patterson, M. D.
J. K. Mitchell, M. D.
Benjamin Reeves,
George Fox,
Thomas P. Jones, M. D.
Walter R. Johnson,
M. W. Baldwin,
James P. Espy,
George Merrick.

MECHANICS.

In this country, happily, no man is compelled by unjust and oppressive laws to pursue any particular trade or occupation, or is doomed by tyrannic custom and prejudice, to remain in obscurity because he did not happen to draw his first breath in a palace.

Here are no privileged classes to claim all the wealth and all the offices as their prescriptive right; but all may aspire to the highest stations in society, and those who are endowed with the greatest share of talent and perseverance, whether they are descendants of a Crœsus or a cobler, will generally attain them. Nor is the question often asked what is the pedigree of merit, or who was the founder of the family of him who has won his way to honor and distinction: true, we sometimes see the face of the vain and conceited distorted by a sneer at the mention of the word *mechanic*, but as those sneers are looked upon by the sensible and intelligent as indicative of a weak mind, ill-breeding and a bad heart, they have seldom any other effect than to excite a smile of contempt. If we look around and see who are the most affluent and influential men in society—who fill our legislative halls—who hold the scales of justice—who are at the head of our benevolent and monied institutions, and who fill the most important offices, we shall almost invariably find them to be men who began the world poor, but have risen to affluence and respectability by their industry, economy, integrity, and the acquisition of knowledge.

Were we required to designate any particular class of men as having furnished the greatest number of those who are properly termed *self-made* men, in proportion to their numbers, we should

be inclined to decide in favor of the mechanics; at any rate, they are entitled to the credit of having done their full share in advancing by their skill and industry, the arts of civilized life and the happiness of the community:—to them do we owe the various and astonishing inventions and improvements that have been made in the arts, especially the mechanical, during the last half century:—the Jenny, the power-loom, and the nail machine, which reduce labor more than a hundred fold; the steam engine, by which, while enjoying all the ease and luxury of a splendid parlour, or the comforts of a soft and downy bed, we are plowing our way through the watery element, against wind and current, or are whirled along the smooth railway, over hills, vallies, and mountains, with a velocity rivalling the speed of the fleetest courser.

To mechanics therefore the world is deeply indebted; but though as a class of men they are highly respectable and respected, yet there are many individuals among them who not only disgrace themselves by the indulgence of idle and vicious habits, but in some degree, cast a stigma upon the whole class: the evil, however, is being remedied, and a reformation going forward. Mechanics, as well as others, are becoming better acquainted with their true interests, and are awake to the importance of raising their moral and intellectual standard: in this work of reformation we most cordially bid them God speed—go on; respect yourselves; and that you may do so, store your minds with useful knowledge; avoid the vices, and shun the society of the idle and the profligate; exert your efforts to repress immorality, and promote education; in short, imitate the examples of your distinguished fellow-craftsmen, FRANKLIN and SHERMAN, who were ever proud of having been mechanics—and you will not fail to secure the respect of the good, and to attain that rank and influence in society which worth and intelligence seldom fail to command.

USEFUL RULES.

I. The diameter of a circle being given, to find the circumference; As 7 is to 22, or as 113 is to 355, so is the diameter to the circumference.

II. To find the contents or area of a circle :

Multiply the *square* of the diameter (the diameter multiplied into itself) by the decimal, .7854, and the product will be the area.

III. To find how many bushels any given sized box or bin will contain :

Multiply the length by the breadth, and that product by the depth ; divide this last by 2150,425, the number of solid inches in a bushel, and the quotient will be the number of bushels the box will hold.

IV. To find the tonnage of a ship by measurement: Multiply the length of keel by the breadth of the beam, and that product by the depth of the hold ; divide the product by 95 and the quotient will be the tonnage.

V. To find the solid contents of a globe : Multiply the diameter by the surface, and divide by 6.

VI. To find the solid contents of a pyramid :

Multiply the area of the base by the height and divide by 3, the quotient will be the answer.

VII. To find how many bushels a hogshead, tub, or any round vessel will contain :

Find the area of the top in inches, according to Rule II ; multiply this by the depth in inches and divide the product by 2150,425, the quotient will be the answer very nearly.

THE EFFECTS OF MOONLIGHT ON THE EYES.

The effect of moonlight on the eyes, particularly in warm climates, is extremely injurious, and oftetimes fatal to the sight. Carnes, in his letters from the east, says that he came near losing his sight from neglecting the advice of the natives, to cover his eyes when he slept exposed to the moonbeams ; and a case came within our own observation, where a child lost his sight by sleeping exposed to the moon. The other senses of this child became, however, as is generally the case with those who lose one, extremely acute, insomuch that he could at any time distinguish a person who had once been made known to him, by feeling his hand.

Errata.—The words, " Good's Book of Nature," at the end of the article on " Cheese," page 87, should have been placed at the end of the article on " Instinct," page 82.

TRANSACTIONS OF THE LYCEUM OF NATURAL HISTORY.

During the present warm season, a recess usually takes place in the sittings of the society. Occasional meetings have been held, however, and some of the ordinary business transacted.

July 19th. Mr. J. Cozzens presented some geological specimens from Herkimer County; also, a fine specimen of the marine catfish (*Silurus marinus* of Mitch.) taken in our Bay. Some beautiful *amianthus* from Staten Island was received.

August 9th. Mr. N. Richards presented some specimens of Ferruginous, copper, and gold ores, from North Carolina. Dr. Hayden, of Baltimore, offered some very interesting organic remains and minerals from the vicinity of Bedford and Buckley springs, Balt. which were referred to a committee for examination and report.

A species of the curious fossil *Bilobite* was presented from Montgomery, Orange County, New-York, by Mr. Isachar Cozzens.

Specimens also of the adder, (*Coluber heterodon*) and a variety of the banded skink, (*Salamandra fasciata* of Green) taken at Hoboken, were offered by a member.

16th. The President presented a rare, and probably undescribed species of *Trilobite* from Trenton falls, which was reserved for examination and report.

USEFUL INVENTION.

A patent has lately been granted in England for an improvement in the manufacture of heels and tips for boots and shoes. This patent is for the peculiar formation of the rollers employed in the manufacture of those articles, in such a way that they shall be made thick in places where they require strengthening, and thin where there is the least wear, so as to combine strength with lightness. Small steel studs are also placed in various parts of the rollers to form perforations for the reception of the nails by which they are fastened to the boot.

To Correspondents.—Several articles have been received, but are unavoidably omitted in this number; they shall appear in our next.